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ABSTRACT

This collection of 18 papers covers four broad areas of teaching and learning in higher education: innovative college teaching/learning strategies; effective classroom research/assessment activities; advanced classroom technology; and developing teaching and learning centers. Titles include: (1) "Changing Teaching Styles When Technology Becomes Part of the Classroom" (Bruce Bosworth); (2) "Problem Centered Teaching and Learning Using Community Projects" (Frank Maling Bosworth II); (3) "Active Learning in Collaborative Groups: Some Lessons and Insights" (Wanda D. Bracy); (4) "Creative Planning = Creative Teaching: Visual Charting of Innovative Classroom Activities" (Carole G. Creekmore); (5) "Integrating Ethics, Education and the Arts" (George Dupuy and Stephen Taft); (6) "What Is the Reality of Virtual Reality?" (Cynthia A. Elliott); (7) "The Use of Portfolios for Reflective Teaching/Learning Activities" (Christy L. Faison and Jody M. Blohm); (8) "Electronic Mentoring Among Elementary Education Interns: Potential Promises and Pitfalls" (Deborah M. Floyd, et al.); (9) "Student Participation in Large Lecture Settings via Instantaneous Small Groups" (Thomas A. Holme); (10) "Establishing a Teaching Support Center at a Land Grant University" (Diane H. Jackman and Michael K. Swan); (11) "Assessing the Assessors: Toward a Modified Portfolio Method of Assessing Student Writing" (Geoffrey Kain); (12) "The New Classroom Environment: Teaching with Computers" (Kathleen King); (13) "The Dyadic Alternative: Organizing Students into Cooperative Pairs" (Norman C. Licht); (14) "Teacher Immediacy Behavior: Student Learning Outcomes and Evaluation" (Mary McLemore and James Cunningham); (15) "Integrating Technology in the Foreign Language Curriculum" (Karen-Jean Munoz); (16) "Enhancing Instruction with Multimedia" (James S. Noblitt); (17) "Addressing Creative Intelligence" (Doris J. Shallcross); (18) "Linking Theory and Practice in Teaching" (Blenda E. Smith). (Most papers contain references.) (CH)

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THE CENTER
for the ADVANCEMENT of
TEACHING AND LEARNING

presents

# SELECTED PAPERS
from the
4TH NATIONAL CONFERENCE
on
COLLEGE TEACHING
AND LEARNING

Edited by
JACK A. CHAMBERS

FLORIDA COMMUNITY COLLEGE
AT JACKSONVILLE

HE 029 792

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Center for the Advancement of Teaching and Learning, Florida Community College at Jacksonville, 501 W. State Street, Jacksonville, FL 32202.

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FOREWORD

The Center for the Advancement of Teaching and Learning at Florida Community College at Jacksonville was created in 1987 with the belief that classroom teachers should be the primary resource to improve and measure teaching and learning in higher education. The idea for The Center was inspired by a speech given by K. Patricia Cross during FCCJ's Celebrate Teaching Week in 1987. FCCJ faculty developed a proposal which resulted in an internally funded grant to create the Center. A faculty steering committee was then formed to plan and direct The Center's activities.

During its first five years, The Center has sponsored seminars featuring educational leaders; conducted classroom assessment, case writing, and teaching portfolio workshops; sponsored a year-long series of cooperative learning workshops; funded more than fifty FCCJ classroom research grants; made presentations at national conferences; and received a major grant from the Fund for the Improvement of Post-Secondary Education (FIPSE).

In addition to the above, in its initial year, The Center undertook a significant project. In an effort to stimulate creative discussion and promote experimentation in teaching to improve the learning process, The Center decided to provide a national forum featuring recognized educational leaders in the areas of teaching and learning. This decision resulted in a commitment by The Center to sponsor a national conference as a major ongoing, annual project.

Foreword

For two years, the National Conference on College Teaching and Learning focused on teaching and learning, classroom research, and the development of teaching/learning centers. In its third year, the meeting planners recognized that, since teaching and learning were enhanced by technology, it must become a major focus. In a cooperative effort with FCCJ's Center for Academic Technology, The Center expanded the conference focus to include technology in the college classroom. This proved successful, so the 4th National Conference on College Teaching and Learning, held in Jacksonville, Florida, on April 14-17, 1993, had as its theme "Teaching, Learning, and Technology in the College Classroom."

This journal represents a cross-section of the excellent presentations at the Fourth National Conference from all four conference tracks:

- Innovative college teaching/learning strategies
- Effective classroom research/assessment activities
- Advanced classroom technology
- Developing teaching and learning centers.

Many people are responsible for the enormous success of the 1993 National Conference on College Teaching and Learning. Thanks to all participants:

featured speakers and workshop leaders; presenters from community colleges, colleges, and universities throughout the United States; and faithful attendees. The Steering Committee for The Center for the Advancement of Teaching and Learning worked for more than a year to plan, develop, and organize the conference. Steering Committee members included June Borden, Sue Buck, Gail Fredrick, Betsy Griffey, Alice Hadwin, Susan Hill, Billie Holmes, Marlene Kovaly, Bill Martin, Jim Mayes, Mary Louise Shannon, and Arnold Wood. B.J. Schukis and Debbie Cyphers deserve a round of applause for their supporting efforts. The Center also appreciates the dedicated work of Jack Chambers and the Center for Academic Technology at FCCJ who planned the technology program. Grateful thanks also go to IBM and Apple Computer who provided the advanced technology for the presentations and contributed in many other ways.

This journal contains a wide variety of scholarly articles reporting new or enhanced methods, a number of which involve technology, to improve teaching and learning in the college classroom. Many of the ideas lend themselves to immediate application to the classroom. Others may be readily adapted to the classroom with minimal effort and resources. All of the articles should stimulate further thought and discussion on quality college teaching and learning among the journal's readers. These readers include the more than 450 conference participants as well as all others in the post-secondary teaching community who desire to make the college classroom a better place for teaching and learning.

Foreword

The papers that were selected for inclusion in this journal were juried by the four faculty members on the Steering Committee of the Center listed below. Selection criteria included:

- Focus of the paper (i.e., teaching, learning, technology)
- Discipline
- Appeal to a general audience
- Theoretical or practical application
- Quality of writing/adherence to format.

The articles which follow satisfy these criteria.

Read, enjoy and make use of the articles in this journal as much as you can. Then, as participant or presenter, plan to join us at the Fifth National Conference on College Teaching and Learning in April, 1994.

Betsy Griffey Professor of English	Susan Hill Professor of English
Marlene Kovaly Professor of Mathematics	Arnold Wood Professor of English

CHANGING TEACHING STYLES WHEN TECHNOLOGY BECOMES PART OF THE CLASSROOM

Bruce Bosworth

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INTRODUCTION

The use of new technology in the college classroom has an impact on how courses will be taught. This article describes the change over from the standard chalk board and lecture presentation to the use of a networked microcomputer and overhead projection display system. It also presents the results of a questionnaire that was sent to 31 St. John's University instructors who were using the new facilities as part of the courses they were teaching. These results can help understand how faculty are implementing newly installed multimedia and microcomputer classrooms and how their teaching styles are changing.

THE NEW TEACHING FACILITIES

The main campus of St. John's University is located in a residential area of New York City. The University has more than 19,000 undergraduate and graduate students. Since 1989, six existing classrooms have been remodeled to provide environments for faculty to explore new ways of teaching computer related subject matter.

One remodeled room is equipped with 50 IBM PS/2, Model 150Z computers and four laser printers. The room can be partitioned into three smaller rooms, two of which are equipped with projection systems. These are ceiling mounted Electrohome three lens, color, high resolution video displays. Five rooms are equipped with an IBM PS/2 Model 60 computer, and a ceiling mounted Electrohome video data projector. All classrooms are linked to an IBM 4381 mainframe in the university computer center via a local area network (LAN) using an IBM Token-Ring Network and Novell software.

In each classroom the traditional front of the room chalk/black board has been replaced with a whiteboard that requires a liquid "dry erase marker," which helps maintain a dust-free environment. The front of the rooms have been divided with a projector screen replacing the center panel of the board. Older rooms have a fixed concave screen, 78 inches wide by 60 inches high, mounted 15 inches off the front wall. Newer rooms have flat panel boards also 78 x 60, but which can be raised or lowered electrically from a wall switch. The basic classroom seats fifty students and measures 24 x 35. Room height is 11 feet 4 inches.

A RESEARCH SURVEY OF INSTRUCTORS

In the late Fall of 1991 and the Spring of 1992, the author distributed a questionnaire to all faculty teaching in these classrooms. The purpose of the research was to explore two areas of interest: 1) if given new technology-based classroom facilities, in what ways will instructors use them?; and 2) how will faculty change their delivery and teaching styles to make use of the technology?

A total of 31 instructors in five different divisions, instructing in 39 different courses were found to be using the classrooms. Thirty of the courses were undergraduate, while nine were graduate courses. The divisional breakdown was as follows: Vocational/Technical (Computer Science) -- 22 courses; Business School -- 7 courses; Liberal Arts -- 7 courses; Library Information Systems -- 2 courses; and Education -- 1 course. From the 31 survey questionnaires distributed, nineteen usable questionnaires (61%) were returned and tabulated.

SURVEY FINDINGS

Faculty Groups

The survey of computer classroom instructors revealed two basic groups -- those teaching programming languages and those teaching application software. Twelve instructors reported using the projection system to teach programming languages such as BASIC or PASCAL. All 12 used the system for the following activities: 1) to display programs; 2) to illustrate concepts; 3) to display and explain logic errors; and 4) to display and explain syntax errors. Of this group, 11 used the display to go over homework assignments, and eight used the display to go over examination solutions.

The second group of users, 15 instructors, were teaching application software such as LOTUS, dBASE, WORDPERFECT, Minitab, SAS, or some other specific courseware. Fifteen displayed material to illustrate concepts. Thirteen displayed and explained errors and mistakes, as well as going over homework assignments. Eight went over examination solutions.

The typical faculty had been using one of the computer classroom for three or more semesters. Most instructors indicated they had little or no difficulty learning how to use the new projection and computer equipment.

Instructors' Perceptions

The survey included a group of questions to elicit feedback on the instructors' perceptions and beliefs. For each question this scale was used:

none a little a lot(circle response)
0 1 2 3 4 5

RESULTS

For each question the weighted average (WA) was computed. The response rate (n), the weighted average, and the survey questions were as follows:

1. n = 19, WA = 4.63 Is the projection system beneficial in the course you teach?

2. n = 19, WA = 4.30 Do you think students appreciate the projection system?

3. n = 19, WA = 4.37 Do the screen presentations help your students understand the lecture topics being discussed?

4. n = 17, WA = 4.12 Do the screen presentations help your students understand the homework exercises being discussed?

5. n = 19, WA = 4.63 For other educators teaching a course like yours, would you recommend the projection system?

6. n = 16, WA = 3.06 With the projection system, were you able to cover more material than before?

7. n = 19, WA = 1.16 Did you find it difficult learning how to lecture and use the projection system?

Changes in Teaching Styles

The survey included open ended questions to give respondents an opportunity to describe changes in teaching style used in the new technology classrooms. The following comments were provided by faculty with respect to changes in the way they were teaching.

FACULTY COMMENTS

"Instead of chalk and an eraser you have to use a dry marker that has a terrible odor."

"You have to put teaching materials onto diskettes."

" You have to learn how to look at the monitor, the screen and the students."

"You have to learn how to use a pointer."

Other changes that affected teaching style as survey responses are the following comments:

"You may find that room lighting can be a problem. In the early morning, with sun light coming into the room, all of the room shades must be pulled down to keep the light off the screen. The room lights must be turned on and off as needed so that students can read the screen or take notes."

"In a room with a middle aisle, with eight rows of four seats on each side of the aisle, students had to be told to take seats closer to the aisle for better visibility."

"There is an echo when you stand eight feet in front of the middle of the concave projection screen."

"There is a need to be careful when moving back and forth when writing on the board as the concave screen is in the middle and frequent collisions must be avoided."

"There is a tendency to speed through programs or other materials displayed on the screen. Students need time to watch the display and take notes simultaneously, so it is important to go slowly."

"Since the screen displays only 24 lines, illustrations may have to be limited in scope. You need to use illustrations from the text so that students can refer back to them."

"You should always have a back up or duplicate of your teaching disk as it will come in handy when forgotten at home."

"Remember to remove your disk from the computer before leaving the classroom."

"You become very dependent on the system and if it should 'go down', it is hard to teach using only the board."

CONCLUSIONS

The use of new technology for instruction at St. John's University has been received with excitement. Seventy-eight percent of the respondents to a survey of faculty using the new technology classrooms indicated they wanted to be scheduled for the new facilities every semester. Over half of the respondents indicated they would not be able to teach their courses without an overhead computer-based projection system. For instructors just starting out with new technology, it is apparent from the above survey that the changes in teaching style when going from a chalk board to a computer projection system should not be a difficult transition.

PROBLEM CENTERED TEACHING AND LEARNING USING COMMUNITY PROJECTS

Frank Maling Bosworth III

Bowling Green State University

INTRODUCTION

Adoption of problem centered curriculum should be given serious consideration by all program areas in higher education to ensure that students consistently achieve meaningful learning as defined by Eriksen (1984; 1974). Problem solving is the core methodology in this approach which relies heavily on both critical thinking (Chafee, 1988; Kurfiss, 1988) and cooperative learning (Johnson, Johnson, & Smith, 1990; Slavin, 1983) to achieve satisfactory outcomes.

There are numerous approaches to

implementing problem centered courses including practicums, internships and case studies. Their commonality is the use of life settings for instruction. Unfortunately, practicums and internships are usually not practical approaches for large numbers of students because of the administrative difficulties associated with both placement and supervision. The success of the case study approach is well documented, but often cases which are related to course materials are not available and they are difficult and time consuming to prepare.

This paper suggests an alternative to the above approaches. It proposes criteria and guidelines for the use of community projects in problem centered curriculum.

CRITERIA AND GUIDELINES

The need for problem centered curriculum may not be immediately obvious, but as the content base for higher education becomes more complex, educators must tap the potential of all learners, including those with unique learning needs, to ensure their intellectual development and ability to function productively in a complex and rapidly changing world. To meet this need educators must require students to assume responsibility for their own learning while providing instruction that satisfies the diverse learning styles of a multicultural student population.

To successfully meet the needs identified above, students must be active participants in the teaching and learning process. The delivery of materials must emphasize learning by doing rather than by listening. The teaching and learning process must help students develop skills to enable them to effectively draw upon their knowledge in new and diverse situations -- they must become critical thinkers and problem solvers. To accomplish this goal, the teaching and learning paradigm must be problem centered. This strategy will enable learners to meet objectives through inquiry and activity in structured or unstructured life settings.

A problem centered curriculum represents a departure from traditional educational approaches in a number of ways, but most significantly it actively engages students in the learning process and requires them to think and act in a systematic fashion to achieve academic objectives. It also requires teachers to be facilitators of instruction rather than subject-centered specialists, a change which requires classroom interaction rather than lecture.

The resulting environment is one that encourages both divergent and convergent thinking, and a thought-and-action process which results in meaningful learning.

Adopting a problem centered curriculum means shifting from content centered to student centered instruction. In this latter approach, the goals of the curriculum dictate the instructional methodology, and emphasis is on the methodological characteristics that follow.

1. Problem solving serves as the primary instructional method.

2. Multiple and alternative solutions are encouraged.

3. Students use exploratory activities such as interviewing, research, modeling and graphing in their work.

4. Instruction is goal oriented and hypothesis driven.

5. Cooperative learning and small group interaction is mandatory.

6. There is a high level of verbal activity among the students and between the students and the instructor.

7. Student cognitive strategies are developed and employed.

8. Cross discipline and interdisciplinary activities are encouraged.

9. A broad range of assessment strategies are used, such as design portfolios, project work, individual and group work and performance testing (Savage & Sterry, 1990).

Ultimately, the purpose of adopting a problem centered curriculum is to achieve more meaningful learning. Educators have known for 20 years that note learning (faculty lecture -- students take notes and memorize them), which is usually content centered, is ineffectual. Despite this general understanding, in many academic institutions the content based approach is still the prevalent curricular orientation. Because the curricular orientation establishes both the instructor and learner modes, its impact on students is significant. As can be seen from the table on the following page, the effect of a curricular orientation on learner outcomes can be a significant factor in achieving meaningful learning... and old approaches die hard.

Table 1. CURRICULAR ORIENTATIONS AND THEIR EFFECTS

Curricular Orientation	Learner Mode	Instructor Mode	Effects
Content Based	Passive	Dispenser	Teaching how to select resources and employ appropriate processes
Process Based	Passive or Active	Dispenser or Facilitator	Teaching the components of a problem solution process as discrete elements
Integrated	Active	Facilitator	Providing a learning experience which integrates course work related to student's major through a problem centered curriculum

(Savage & Bosworth, 1993)

The litmus test of any curriculum, however, is not its espoused orientation, but whether meaningful learning is achieved. Eriksen (1984; 1974) reinforces this point by emphasizing that for education to be successful the material learned must be useful over time. Thus it must appear to have relevance.

Students noticeably respond more favorably to active learning in a context that has relevance for them. Only curriculum which delivers material in an integrated manner, drawing upon a student's total knowledge base and making connections among diverse subject matter, can consistently overcome student difficulties in seeing the relevance of course content to their overall needs. Integrated learning, which is problem centered, makes education meaningful and relevant because the situations students work with are related to real, and frequently their own, life experiences.

IMPLEMENTING

PROBLEM CENTERED APPROACHES

There are several approaches to implementing problem centered courses.

Among the most important are the case study and the community project. The use of case studies is the most common form of problem centered instruction in the classroom, and has been an integral part of business education for many years. The case study is prepared from either a fictitious or real-life situation that illuminates specific course objectives. Although generally considered an instructional tool in graduate education, case studies are applicable in many areas of undergraduate education as well, and their integration into curriculum is growing but is still not widespread.

The second and less frequently used approach to problem centered teaching is the community project. This type of instruction is based on an actual community situation in which students are involved in both discovering the parameters of the problem and setting an approach to its resolution. The community project enhances the relevance of the underlying course material because students are interacting directly with members of the community, and the impact of their decisions is seen immediately through the responses of the community members to their work.

The approach to integrating community projects into problem centered course curriculum requires six important activities prior to the initiation of any project.

- Establish clear and concise goals and objectives for the course.

- Create clear and concise goals and objectives for the community project.

- Create a process framework for student activities including methods for achieving consensus and accurate communication.

- Create a process for conflict resolution

- Create a framework and the criteria for evaluation of student work.

- Discuss and agree upon the teaching and learning strategies that will be used in the course.

The results of these discussions comprise the process rules for executing the project. These rules are project specific and are not transferable from project to project. They are intended to help students learn to manage complex problems through group participation, and emphasize group decision making at all levels.

The selection of a community project for class use requires considerable advance planning. There is no specific type of project, but one that has a basic subject or work function related to the course material is usually best. Some examples of projects that have been undertaken are historic building studies, village analysis for historic preservation and economic re-vitalization, impact of recycling on community landfills, reading/literacy projects in rural school districts, development of inclusion models for students with disabilities, and assessment of identified at risk students.

The above are only a few of many examples that show the diversity of projects that can be undertaken. However, although they represent activities in diverse disciplines, each project contained the following basic learning activities which form the basis for community projects.

- Problem setting: analysis of the situation, determination of the problem and necessary outcomes, and establishment of academic and community goals.

- Group dynamics: developing strategies to achieve a stated goal through group work requiring consensus.

- Community interactions: meeting and discussing the situation with the people involved, interpreting information, dealing with conflicting goals and objectives usually resulting in compromise.

- Evaluation: finding appropriate measures to determine the success or failure of the project.

- Final report: learning to write clearly, and coordinating information from many sources.

- Presenting findings: preparing a formal presentation and speaking to community audiences.

A successful community project provides a rich learning experience for everyone involved. At a time when institutions of higher learning are looking for ways to express relevance to the communities they serve, it provides an opportunity for meaningful exchanges which benefits both groups. For instructors, it often revitalizes thinking about course material and provides opportunities for research and scholarly investigation. If nothing else, each community project results in a case study that can be used in subsequent classes either as a substitute or precursor to other community projects. Finally, implementation of community projects requires flexibility and patience, but results in student vitality and interest in subject matter which is otherwise difficult to achieve.

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ACTIVE LEARNING IN COLLABORATIVE GROUPS: SOME LESSONS AND INSIGHTS

Wanda D. Bracy

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INTRODUCTION

The purpose of this paper is to describe how collaborative groups were used in an undergraduate research methodology course in which it was hypothesized that specific structural variables would enhance positive interaction which in turn would facilitate learning. This paper will describe efforts to form collaborative groups to enhance learning in an introductory research course, and provide information on the assessment of this effort.

LITERATURE ON COLLABORATIVE GROUPS

Collaborative learning in the college classroom has been receiving an increasing amount of attention in the literature. Proponents of this approach to instruction and learning have conceptualized the critical features of collaborative learning and its underlying assumptions (Bruffee, 1984; Smith and MacGregor, 1992). This increasing attention has also produced its critics who think this approach denies a pluralism of intellectual styles (Feaster, 1992), does not explain how or why collaborative learning is an effective teaching approach (Clegg, 1990), or prepares students to perpetuate the negative aspects of capitalism in the workplace (Beckman, 1990).

The bulk of the literature on collaborative learning, however, consists of a description of strategies on how to manage the process of implementing cooperative groups (Cooper and Mueck, 1990; Bowen and Jackson, 1985-6), how to design learning tasks (Wiener, 1986; Hawkes, 1991), how to increase the effectiveness, either through norm structuring (Keleman and Spich, 1984-5) or presentation of techniques to prevent or manage conflict (Jalajas and Sutton, 1984-5).

There have also been several empirical investigations -- surveys of faculty and students on their perceptions of the use of collaborative groups in the classroom (Liden et al, 1985-6; Feichtner, 1984-5; Kantambu and Raffoul, 1991). This empirical research has resulted in the identification of variables that affect student learning in collaborative groups, and served as a base of information for the author's use and evaluation of this approach to instruction and learning.

DESIGNING COLLABORATIVE GROUPS

Composition of the Groups

Since some have suggested that the optimum size of groups is between four and seven members, it was decided to form four groups with four members each. It has also been reported that the best group experiences were among those that were formed by the instructor; therefore, it was decided to form these groups on the basis of similar learning styles, using Kolb's Learning Style Inventory for this purpose. There were two groups of assimilators, one group with three accommodators and one assimilator, and the remaining group with three divergers and one converger.

Learning style was used as a primary criterion to form groups because it was presumed that this factor would enhance group cohesion. This view was based on the assumption that those sharing similar approaches to learning would approach the learning task from a common perspective which would facilitate group interaction and reduce conflict. Where possible, gender and cultural diversity was addressed in group composition. All groups had at least one or two minority students; however, only two groups had male students.

Designing and Managing the Learning Task

The learning objective in this course was to enable students to critically review empirical research. Therefore, the learning tasks consisted of having students identify the contributions and limitations of selected research articles. This task consisted of responding to questions about particular aspects of the article that provoked discussion and required consensus on the part of students.

Students were given assigned articles at least one to two weeks in advance, and were expected to read and critique the articles prior to class. At least 15-30 minutes of class time was allowed for group discussion and consensus prior to their presentation to the class. On some occasions each group was assigned a different article, and on other occasions all groups were assigned the same article. In these latter situations, after each group presented their critique, the emphasis shifted to differences across groups until consensus was developed for the entire class as to the contributions and limitations of a particular piece of research.

The instructor's role during this process was to informally "listen-in" on group process and occasionally give some direction or raise thought-provoking questions for the group. In the group presentation and discussions, the instructor demonstrated how the students' ideas illustrated research concepts and issues in methodology. Emphasis was placed on helping students understand the basis of their reactions to research articles and to validate that they in fact had legitimate points of view regarding research in their profession.

Groups were also required to submit a written group exam and were given at least three weeks to complete this assignment. Each group was required to critique an empirical research article, identifying the contributions and limitations and its implications for social work practice.

Grading the Assignment

Research has indicated that students' best experience in groups were those classes in which 20% or more of the grade was based on group work and, there were multiple opportunities for feedback. In this course, two-thirds of the final grade was based on collaborative group work, and students were given feedback at multiple points in the course. For example, the grade for the first exam was distributed between the written and class presentations with 75% and 25% respectively.

The procedure for grading the class presentations was to assign pluses for the depth and insightfulness of ideas. The written portion used this criteria, as well as students' ability to identify and apply critical research concepts and issues. On the written portion of the exam, students were asked to sign the exam and indicate the percentage of effort each contributed to the completion of the exam.

ASSESSMENT OF COLLABORATIVE EFFORTS

The purpose of the assessment was to examine if these structural variables facilitated group interaction and thereby enhanced learning. Thus, students were administered an instrument designed to assess their perception of group process and interaction, as well as how they perceived collaborative groups facilitating or impeding their learning. This instrument was a modified version of one suggested by Keleman and Spich (1984-5) and consisted of 17 items on which students rated other members in their group on a scale of 1-5, with 5 being the highest. (There were four reverse scored items.) The instrument was anonymous and it was therefore not possible to identify group process for specific groups. However, the data were quite useful in identifying how this approach was perceived by individual students, which provided a basis for conclusions about group process.

Assessment of Group Cohesion

At the time of this writing, 11 instruments had been returned. Due to space limitations it was decided to report on a key item that could serve as an indicator of group cohesion. This item asked students to rank other members on their demonstration of goodwill toward others and their contribution toward cohesion in the group. It was decided to calculate the average rating for each individual and then compute the average for the group. Of the 11 students, seven resulted in an average rating of 4.0, and the mean for the 11 students was 3.8.

While this was not as high a rating as expected, it did indicate that most students experienced cohesion and goodwill in their groups.

Assessment of Contribution to Learning

To assess the extent to which collaborative groups enhanced students' learning, another item on the instrument was selected as well as student responses to an item asking them to check the ways in which the group contributed to their performance. The first item asked students to rate other members in the extent to which they contributed to other group members understanding of the task. Of the 11 students, six resulted in a rating of 4.0 or higher, and the average rating for the class was 3.6. When asked to check ways in which the group contributed to their performance, six of the 11 students checked that group participation helped them better understand the content of the course. These results were disappointing in that the design of this approach was to enhance the learning of students.

CONCLUSIONS: LESSONS AND INSIGHTS

After some reflection on student responses, it appeared that the task may not have been the most appropriate for learning basic research concepts and methodology. This approach was selected on the assumption that students have "common sense" reactions to empirical research, and if permitted to discuss their views about empirical research articles would be more comfortable with research and feel less intimidated. It was believed that collaborative groups would enable students to exchange views and opinions and increase their understanding of the structure of research.

According to Hawkes (1991) collaborative learning can be accommodated to different teaching purposes, however the task must be appropriate to the level of knowledge and skill of the student, and the time frame given. He presented three guidelines for group questions for a 50 minute class: 1) limit number of questions to two or three; 2) organize questions in such a way that it moves from low involvement to high demand; and 3) make all questions open-ended, i.e. do not ask factual questions.

An example of the type of question used in this course was: "What was the gap in knowledge the researcher wanted to address and, in your opinion, how well was this done?" Group responses to this type of question were used to illustrate that they were actually applying some research concepts in their critique, or issues in research methods would be pointed out. With hindsight it is now assumed that students were expecting to get the "right" answer and may have been disappointed with their responses for this reason. While the questions were open-ended, students interpreted them as more factual than the instructor intended.

Overall, the instructor was pleased with this approach to the course, when comparing it with previous approaches. There was less conflict and anxiety about research, which is attributed to how the groups were composed and the opportunity students were given to discuss their reactions to how they were classified on the Kolb Learning Inventory as well as the Myers-Briggs Type Indicator. This initial "sharing and getting to know each other" is assumed to have minimized conflict and enhanced group cohesion. This is evidenced by responses on the instrument as well as each students' distribution of effort on the exam. All students stated that efforts were evenly distributed, and not one student indicated a concern in this regard on the instrument.

The following student quote is certainly an inspiration for the improvement and continuance of collaborative groups in this course:

"I learn from discussing different points of view, so this was o.k. for me. I also like the opportunity to learn skills that will help me work with different types of personalities."

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CREATIVE PLANNING = CREATIVE TEACHING: VISUAL CHARTING OF INNOVATIVE CLASSROOM ACTIVITIES

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INTRODUCTION

Too often the new or even experienced teacher concentrates so heavily on developing creativity in students that the process of preparation that precedes creativity is minimized. The most successful classrooms, at any level, are the ones in which the teachers first demand creativity of themselves. There is no scarcity of sources offering innovative ideas for the classroom -- education courses, textbooks on teaching, and workshops, to name a few. The problem is not the availability of sources offering creative help for teaching -- the problem is realizing when such help is needed and then finding the time to use it.

An instructor who modifies her or his own behavior first is taking a vital step toward improved classroom creativity. This step also helps to end perhaps the most negative influence on a class -- chronic boredom for teacher and students. Reward is also found in the creative process. "By becoming interested and spiritually involved in the (learning) activity, the process may become a reward within itself" (Johnson, 1990).

Another most pleasing reward is the reward of time. With the proper planning and organization of course preparation, the instructor ends up with more time to devote to classroom activities.

DESCRIPTION OF APPROACH

The first step in effective organization of planning is to be able to visualize the planning process in manageable units. Any planning system helps, but most effective is a one-page plan that covers the basic skills to be taught in a course. A simple chart can be prepared by hand, or even better, with some sort of computer software program. A good workable plan can be adapted for any discipline, course, or set of skills.

The chart below is an example of one prepared for a basic English composition class. On the left side of the chart are the five main areas that are emphasized in the course. Across the top are three types of student groupings: groups, peer pairs, and individuals. A planning chart such as this is noteworthy because of its simplicity. It concentrates on two areas only -- skills to be taught in a course and the approaches to these skills.

Of utmost importance in planning is identifying specific objectives for a particular course. These objectives must address the "intended result of instruction, rather than the process of instruction itself (Mager, 1975). Next, an instructor has to decide what teaching approaches are preferred. Variety here is a key -- the lecture which is so often used shares time and even gives way to group work, peer exercises and individual lessons.

ENGLISH COMPOSITION PLANNING CHART

	GROUP	PEER	INDIVIDUAL
COURSE EXPECTATIONS	Group Essay ------------> Jitters Essay Evaluation	CAI Exercises	Diagnostic Essay
GRAMMAR & FORM	CAI Exercises	Peer Essay Proofing	Grammar Journal & Exercises
COMPOSITION BASICS	Class Topic Pool	Peer Introduction Preparation	Two Introductions Exercise
PERSUASIVE ESSAYS	Library Topic Collection	Proposition Proofs Sharing	Collection of Logical Fallacies
LITERARY ANALYSIS	Literary Detective Work	Peer Dialogues on Short Story Topics	Readings Journal & Workbook

Each box of the chart can be filled in with some idea or variation that has been tried successfully or a new idea utilizing the skill to be emphasized. An instructor in each new planning session ends up with several new methods to try per course, several past successes to build on, and a visual chart of the instructor's own progress towards more creativity.

Areas needing focus can easily be seen. A lesson, for example, might be needed to combine individual work with composition basics (in a composition class). This could involve the simple individual exercise of writing two introductions with completely different approaches for the same essay. Such an exercise requires the student to search for more than one way to start an essay -- in other words, to think and be creative.

Another exercise might involve group work early in the course to learn course expectations. Groups could evaluate and revise a sample mediocre essay (prepared by the instructor). This exercise on course expectations focuses the students on realistic expectations for their own grades as well as editing skills and group interaction.

Third, student pairing might be used to become familiar with a word processing program in a computer-aided classroom. Student pairs could work together to complete computer and word processor familiarization exercises. In such situations, it might be advantageous to pair more computer-literate students with those who are less experienced.

Adaptability and Evaluation

The instructor using this system develops a clear reference of exercises available for each course, as well as an overview and review of the course goals and contents. The instructor also has a clear history of the course's planning which will be of benefit in developing related courses in the future. Experiments that have been executed with less success can be modified or discarded; successful exercises can be retained and edited.

Areas needing focus for new approaches become obvious by gaps in the chart. (A good manageable plan is to try to add three new lessons or so per course.) Using such a plan, the instructor takes control to become the "director of learning" rather than just the "transmitter of information" (Mischen, 1987).

Evaluation of the success of the planning process comes in two stages. The first, short term evaluation is provided by student reactions to the exercise. Longer term evaluations come from the instructor's comparison of course charts over a period of time. By recording evaluation summaries (by both students and the instructor) on the charts themselves, a good record of exercise feedback is kept for future reference. A visible history and concrete feedback of accomplishments are both easily possible and recordable with charted planning.

CONCLUSION

The planning chart described is a practical guide for the instructor, a simple plan of action to organize planning so that valuable time is saved while creative lessons result. Teachers want and need to take a more personal, active role in keeping their own skills and approaches fresh. Paradoxically, structured planning frees and actually leads the way for the instructor to be creative.

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INTEGRATING ETHICS, EDUCATION AND THE ARTS

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INTRODUCTION

One of the biggest threats to our free enterprise system is the abuse of that freedom by unethical business people. Ethics has always been an issue in business, but it has become a more critical issue in recent years with serious abuses like Wall Street insider trading and the savings and loan fiasco. A recent Fortune article (Labich, 1992) asserted that unethical business behavior is increasing. Continued ethical abuse is likely to lead to increased government regulation and, thus, decreased freedom in business.

Higher education is responding to this threat by placing more emphasis upon the teaching of ethics in business courses. Unfortunately, ethics is extremely difficult to teach. While many serious ethical abuses are clearly illegal, most ethical issues are not black and white; there are many shades of grey, depending upon differing personal ethical values. What may be ethical in one person's value system may be unethical in another's. Therefore, it is critical for students to examine their value systems in relation to others--again, a difficult subject to teach.

DESCRIPTION OF THE PROGRAM

The authors developed and implemented an innovative program that helps to make ethical education both interesting and effective. The program consists of two major components: 1) the performance of a condensed version of the play, The Visit (Durrenmatt, 1956) by a cast of ten to an audience of twenty to twenty-five participants; and 2) following the performance, an extended discussion of the play's ethical issues by the actors and the participants.

The Visit is a powerful and entertaining tragicomedy that revolves around a moral dilemma. Presenting a condensed version of the play is necessitated by the environment of the performance space and the time constraints inherent within the scheduling of various seminar activities. Audience participation techniques are used to involve the program participants in the moral dilemma.

Seeing the play performed and, more importantly, becoming a part of it, add an extra dimension to the discussion that follows. A facilitator asks participants to share their feelings and reactions to the play, and the discussion is always quite lively, sometimes even electric with energy and emotion. The educational purpose is not to teach ethical principles, but rather for each participant to explore her/his own values and ethics in relation to others. Such self-discovery should be invaluable to participants when they confront ethical issues on the job.

Artistic Challenges

The primary challenges of directing The Visit include: 1) editing the play; 2) casting the play; and 3) presenting the play in a non-traditional theatrical performance space. Seminar activities require that a presentation of The Visit be held to approximately thirty minutes. Such a restriction requires the selection of key scenes that best represent the whole play. The challenge of the director is to insure that the presentation has a beginning, middle, and end. In addition, the edited script must provide ample opportunity for background information, character development, and dramatic build, yet still maintain the spirit of Durrenmatt's tragicomedy.

Actors for The Visit are hand-chosen by the director. The acting company includes two Theatre Arts faculty, four Theatre Arts majors (including a retired professor--former Chair of the LaGrange College Psychology Department), one business major, and three non-declared students. The casting is based on talent, diversity of background, academic standing, dedication to the project, and perceived maturity. Of the eight student actors there are two seniors, two juniors, one sophomore, and three freshman. The company represents a cross-section of the student body including age, major, and year in college. Such casting also affords the student and professor to work alongside each other as fellow performance artists.

It is preferable to be able to present a play with all of the theatrical elements (sets, lights, sound, costumes, props, etc.). However, for this program the performance space is limited to a large meeting room on campus or at a resort convention center. Essentially, The Visit is always "on tour." The company does not have access to lighting or sound equipment in such facilities, setup time is reduced to minutes, and it is essential to reduce the aesthetic distance between the company and the seminar participants as they actually participate in the presentation. Fortunately, such a minimalist presentation is in line with Durrenmatt's philosophy: "In my view, a play is acted in the theatre according to the limits and possibilities of the stage . . . they should change the sets without pause or curtain . . . ." (Durrenmatt, 1956).

PROGRAM BENEFITS

The program has a variety of benefits: 1) the program immerses student actors and participants in the examination of ethical issues and their personal value systems; 2) the program introduces liberal arts students to business issues and perspectives; 3) by presenting this program to leaders from the Southern Regional

Education Board (SREB), educators are introduced to this innovative program, noting the importance of theatre as an educational tool; 4) by including student actors in the executive discussions, both groups are exposed to ethics and values from a different generation's perspective--helps close the "generation gap"; 5) for years, people have expressed the conventional wisdom that the arts are valuable for business education--here is a program that actually integrates the two; and 6) executive training sessions provide positive visibility for a small, private liberal arts college to an important target market--upper income parents of potential college students.

CONCLUSION

Integrating ethics, education, and the arts crosses disciplinary boundaries. The two academic disciplines involved, business and theatre, appear to be at opposite ends of the academic spectrum and rarely interact with one another. In fact, a recent literature review uncovered no publications that addressed relationships between business education and the performing arts. However, because of their involvement in this program, students of LaGrange College are becoming more aware that ethical issues confront everyone in all academic disciplines and in all societies.

Nationally, as well as locally, college graduates will confront ethical issues throughout their careers. For the business major it may be situations on a grand scale such as Wall Street insider trading or seemingly smaller situations such as downsizing a company.

Theatre majors will face similar ethical issues in their future. Recent guidelines instituted by the National Endowment for the Arts force artists from all artistic disciplines to examine their personal values in addition to the values of the organization of which they are employed. The theatre student will be challenged in the professional world of theatre and film to perform works that may contain nudity, offensive language, and/or subject matter that may not be reflective of their value system. Like the citizens of Guellen in Durrenmatt's play, The Visit, opportunity and money will be offered. The promise of a more affluent lifestyle will be within reach. The question remains whether students of today (business or theatre) are prepared to resist the temptations inherent within their respective fields? The decisions made will have a direct impact on the quality of life the students lead and the quality of life within their community and in our society.

The uniqueness of this approach to the study of ethics has resulted in adoption of its use in a number of areas. The program began as part of the BellSouth Executive Education program, Leaders of Humanity, and was developed and presented by Zygmunt Norgorski, President of the Center For International Leadership. Word of the program's success has spread so that it has also been integrated into leadership training by Capital Holding Corporation, Dun & Bradstreet, and the

Southern Regional Education Board. It was such a valuable learning experience for the participants, that the program is now also offered on the LaGrange College campus for even greater student and community participation.

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WHAT IS
THE REALITY
OF
VIRTUAL REALITY?

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INTRODUCTION

"Virtual reality, the creation of highly interactive, computer-based multimedia environments in which the user becomes a participant with the computer in a 'virtually real' world" (Helsel & Roth, 1991, back cover) is being popularized by scholars, educators, information scientists, philosophers, artists, and others. But what actually is it? Where is research being conducted? What applications exist today? What are its implications for education? Do other technologies do the same thing? This paper will explore these questions by defining the terms, identifying key research and development centers, discussing current applications, reviewing the implications for education and discussing the technology's future.

Overview and Definition

The term virtual reality is almost like an oxymoron, a combination of contradictory or incongruous words. Virtual or artificial reality enables users to become participants in abstract spaces in which the physical machine and the physical viewer do not exist, although the viewer perceives the environment to be real.

Webster's Dictionary defines virtual and reality as follows: Virtual--"being in essence or effect, but not in fact"; Reality--"a real event, entity, or state of affairs" (Merriam, 1971). Thus, virtual reality may be paraphrased as "a real event that is such, in essence, but not in fact."

In essence, virtual reality is an advanced technology in which the individual experiences at least the visual sensation of being immersed within the images. This is most notably accomplished through the use of a wide field-of-view, stereoscopic head-mounted or head-coupled display device.

In a broad, historical perspective, computer-based virtual reality comes from software engineering. Computer scientists use "virtual memory" to mean computer RAM, which is memory which the computer uses as if it exists beyond the actual hardware limits. The term virtual from a contemporary standpoint has come to be connoted as an adjective referring to a reality that is not a formal, bona fide reality, such as virtual mail or virtual work groups on computer networks.

Virtual reality has been popularized by the hardware associated with its use. Stereoscopic head-mounted displays (typically called headsets or goggles) incorporate a small device to track the position of the x, y, and z three-dimensional coordinates and orientation of the head in 3-D space. As the wearer moves, the images in the display device are updated to reflect these movements. This provides the visual sensation of inclusion within the 3-D model.

Two slightly different computer-generated views are projected on tiny liquid crystal screens inside the goggles or headsets. This produces 3-D effect for normal vision, created by the physical fact that neither eye is perceiving the same thing from exactly the same perspective. As the person turns her/his head with the headset, s/he sees the scenes from different angles, just as in real life. In addition, a magnetic sensor on the headset transmits the changes in the head's orientation to the computer for recalculation of the viewpoint presented on the screens inside the headset (Bylinsky, 1991).

The data glove is another popular computerized component which is associated with virtual reality. This instrument measures the position of the hand and the movement of the fingers with optical fibers and sensors. In essence, the data glove takes the place of a mouse. The individual is able to see her/his hand inside the virtual world, which permits the person to explore and have a point of orientation inside this world.

The difference with virtual reality and other forms of multimedia is that virtual reality is created by a display-and-control technology that surrounds individuals with an artificial environment mimicking real life. The person interacts with objects and settings as s/he would in the real world. There is no passive viewing of computer screens. Although interactive multimedia allows manipulation of objects on a touch screen or with a mouse, virtual reality provides full participation in a 3-dimensional setting.

Some argue that virtual reality does not require a head-based system. What is necessary is the illusion of being somewhere other than where you are. All the human senses are invoked, including the sixth sense of the experience of time. The other senses seem to sweep the environment, generating complex, multi-dimensional data for the brain to process.

As with any new advanced technology, virtual reality has become a "hot" buzz word that is now being applied to a wide range of new graphics and display technologies. The literature seems to be using several terminologies interchangeably to represent this personally controlled computer environment--virtual reality; artificial reality; cyberspace; and telepresence.

Possibly the best way to define this new field is to quote some of the scholars who are working with the technology:

"The primary defining characteristics of virtual reality is inclusion, being surrounded by an environment. Virtual reality places the participant inside information."--William Bricken, Principal Scientist, Human Interface Technology Laboratory, University of Washington (Meckler, 1991, p. 1).

"Virtual reality represents the latest development in human computer interface design. The basic goal is to provide the computer user with a multi-dimensional environment in which to work. This computer generated environment will exploit many of the human's innate sensory skills to enable more effective assimilation of data, through visual, audio, and tactile data. We are attempting to generate not an interface to a computer, but rather a completely alternative environment in which the user directly participates in a computer generated world."--Charles Grimsdale, Division Limited (Meckler, 1991, p. 12).

RESEARCH AND DEVELOPMENT

There are many public and private organizations which have committed to research and design of virtual reality systems. The University of North Carolina, Chapel Hill is a pioneer in such research and development. Some of their projects include a radiation therapy treatment, flying through a 3-dimensional modeling system of protein molecules, an interactive building walk-through, and a mountain bike with force feedback. In the mountain bike experience, participants can lose their balance and start to fall off the bicycle even though it is stationary on a platform.

Much of the work on virtual reality has come from the NASA Ames Research Center, which developed the Virtual Interface Environment Workstation (VIEW). It allows the operator to explore a 360-degree synthesized image with a wide-angle stereoscopic display unit, glove-like devices and speech recognition technology. Developed by Mark Bolas of Fake Space Labs, NASA Ames Research Center is also utilizing the BOOM (Binocular Omni-Orientation Monitor), a counterbalanced stereoscopic viewing device which enables interactive and real-time viewpoint control of 3-D environments generated by a computer or a camera. The BOOM, which is self-standing, provides high resolution and fast tracking. It is reported that people can use it comfortably to provide up and down motion, and 360 degree vision, while permitting the individual to look away rather than being confined to a headset.

In other research, Eastman Kodak engineers have gained new insights into the understanding of polymers for their camera cases with 3-D technology. Through an understanding of how polymers untangle themselves by actually viewing this in virtual reality, the company has been able to design lighter, thinner parts that require less material and meet environmental standards (Bylinsky, 1991).

APPLICATIONS

Virtual reality applications are finding their way into commercial operations and education. Some of the commercial applications which are more obvious and understandable include Boeing's simulation of pilot training. Boeing has had more than 100 of its engineers and executives fly inside the virtual airplane and has a corporate steering committee to explore potential applications (Bylinsky, 1991). The U.S. Department of Defense has used virtual reality for pilot training, particularly during the Middle East Crisis (Elliott, 1991).

Marketing applications include Matsushita Electric Works in Japan, which is using the U.S.-built headsets to demonstrate its custom-built kitchens in a "virtual kitchen." A customer gives the dimensions of the kitchen and the kind of appliances to a salesperson. This information is fed into a computer, the customer puts on a headset and the new kitchen appears before her/him in which s/he can move about freely to get a feeling for the space, open the doors, appliances, and cabinets to make sure that the space is workable. The sales clerk then ships the order to the factory and the customer receives the custom-built kitchen within two weeks.

It is conceivable that architects and designers will be the biggest users of virtual reality. Virtus Corporation has a virtual reality package for architects which permits the architect and the client to view both the inside and outside of a house or building from different perspectives.

Medical applications abound. Surgeons can, in essence, superimpose on patients an image of what the results of surgery should look like. Physical therapists are able to practice and model certain leg and arm motions for strengthening muscles. Apple Computer, in cooperation with Stanford, MIT, and Northwestern University, is developing virtual reality systems of the human body to view and study the bodily systems from many angles, thus creating the ability to study stress and tolerance of certain parts of the body to certain procedures. Traumabase, a project supported by the U.S Army Medical Research Center, applies the virtual reality concept to the study of war injuries (Henderson, 1991).

Pharmaceutical researchers are wearing 3-D goggles for visualization of molecular structures in hope of studying the docking mechanism of molecules related to disease control.

Yet, probably the largest possibility at present for virtual reality is in the field of entertainment. The video arcade business in the U.S. will likely follow suit to that of the United Kingdom with "pay per experience" opportunities. It also may not be long before virtual reality is seen in the movie theaters. A major pioneer in virtual reality research recently formed a joint venture with a division of MCA to build a series of test theaters within the next two years (Bylinsky, 1991).

IMPLICATIONS FOR EDUCATION

This new technology has implications for education. Interaction is key to motivation which in turn is key to learning (Palardy, 1990). The greater the participation, the more learning is facilitated. In today's classroom, the experience is mostly passive for the majority of students. Applying virtual reality techniques could improve motivation in the learning setting as education moves from a reliance on written text to imagery and from a reliance on abstractions to experience-based learning (Helsel, 1991).

There is a trend in education from the conceptual to the perceptual. More educators will likely seek ways to visualize materials that were formerly represented mathematically partly because perceptual intelligence is an ancient acquired human skill.

There is some evidence that simpler visual presentations of complex material can increase comprehension to such a degree that even mediocre students become good students (Bylinsky, 1991). More difficult subjects, like quantum physics, could become more understandable if students are submerged in virtual quantum space. Driver training, criminal justice, and aviation are only a few of the obvious areas that could benefit from computer simulated, interactive, 3-D realistic presentations. One university currently using virtual reality is the University for the Arts in Banff, Canada, which is bringing 3-D art forms to life.

Museums, however, are likely to begin using virtual reality before schools. What starts as good entertainment actually becomes good education in these situations.

The BOOM also has implications for education and training. Instead of using a joystick or mouse in a 2-dimensional environment with a videodisc, the learner could use a BOOM to control a 3-D simulation.

It seems to this author that a first step use of this technology in education may be 3-D audio where the sound is localized in space so that when participants move, the sound stays with them. Only the future will reveal how virtual reality will be used most effectively in education and training. Cost will most certainly be a factor, as discussed later in this paper.

FUTURE OF VIRTUAL REALITY

Virtual reality is exhibiting signs of a healthy industry in the making. There are many high-quality, useful products either currently available or soon to be released. However, as with any new industry, it is not without problems.

As with most other high-tech fields, research and development in virtual reality occurs in university, government, and industrial labs. Unfortunately, additional academic sites are seeking support for virtual reality research and development at the same time that corporate and industrial funding is decreasing, due to the general state of the economy. In these lean economic times, it would appear that the industry is idle. But this is not the case. Over the past two years, strategies for the commercialization of virtual reality have appeared, particularly in "pay per experience" entertainment systems.

Today the United States leads in virtual reality development. But as seen with automobiles, semiconductors and consumer electronics, this leadership may not last. The creation of the technology is only the beginning of an industry. Leadership in virtual reality will be the ability to develop quality, affordable products. The first and only complete virtual reality systems developed for use by the arcade/entertainment industry are designed and manufactured in the United Kingdom. The end-user response to these "pay per experience" systems has been tremendous, with the manufacturer reporting impressive sales figures and profits (Aukstakalnis, 1991).

One question that remains unanswered about virtual reality is whether people will wear headsets and goggles in routine business or educational settings. The experience of 3-D movies would suggest that there will be resistance. Children are not likely to be resistive, however, particularly if VR creates more realistic games or makes learning fun.

To counteract this resistance, there is discussion about eyeglasses or even contact lenses. With such small glasses, video cameras can see the faces of the individuals so that the graphic reality and the true reality merge. In these situations, participants in diverse areas can appear to be sitting on real chairs around each other (Krueger, 1991). Another possibility is surround display (like surround sound) in which participants would not wear a headset but still achieve the same effect (Elliott, 1991).

Multi-person capability for virtual reality is now available. This has important potential, particularly for education and sports. Virtual spaces will likely be more lively when persons can interact with each other as well as with computer objects in cyberspace rather than through a headset.

It is unfortunately true that the cost of virtual reality is high at present -- too high for applied usage with large numbers of persons in other than cost-recovery operations such as the entertainment industry. However, as multimedia and virtual reality merge, and as line graphics, stereo, videodisc images and multiple other applications merge, the ability to produce low-cost systems with 3-dimensional graphics will occur.

Virtual reality is not a single, new technology, but a unique grouping of enabling technologies that have been around for some time. Thus, these existing technologies create certain standards and compatibility issues. It seems to this author that standards for content of virtual reality need to be considered.

CONCLUSIONS

Virtual reality is a medium that is emerging from a new way of thinking about computers and their relationship to human experience. Interactive multimedia places the display of information under the control of a computer program and the individual. Virtual reality is a multimedia environment, but it provides individuals with a sense of participating in realities different from their own. This permits persons to experience things from more than one point of view of a given scene or from a distant or hazardous environment, which can be transferred to, applied to, and even enrich everyday life. Thus virtual reality holds great promise for tomorrow, and its future is in the hands of educators and others who are willing to provide the motivation and dedication necessary to advance a new and struggling field.

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THE USE OF PORTFOLIOS FOR REFLECTIVE TEACHING/LEARNING ACTIVITIES

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INTRODUCTION

Recently, attention on summative evaluation of student achievement in terms of a portfolio has increased. The essence is determination of student progress in achieving specific competencies based on a cumulative collection of items directly related to developmental learning.

The concept of a portfolio is sensible because it illustrates the growth and mastery of knowledge on a year-to-year basis. The portfolio is a systematic means for a student to adapt and modify behaviors as indicated by her/his performance in learning. The most common application of the portfolio has been as an evaluative instrument. However, the portfolio system can also be applied as a means of reflection for the student, i.e. 'what needs improvement?'

The secondary education teacher preparation program at Rowan College of New Jersey was revised in 1988. At that time, faculty members were interested in ensuring that they were delivering a comprehensive, developmental, sequenced teacher preparation program steeped in the knowledge base. It was no longer acceptable to believe that 'chunks' of content could be delivered in isolated courses, but rather that content should be presented and developed in a series of connected courses. In addition to connecting the courses, it was deemed essential to give considerable attention to program outcomes. The use of the reflective portfolio was viewed as a means of accomplishing these goals.

RATIONALE FOR THE USE OF THE PORTFOLIO

During the early part of the 20th century, John Dewey espoused that change was ever present throughout society as well as in education. Dewey's concept of change was stated in terms of improving the future by thinking about the experience of the past. In today's terminology, it is called 'reflection.' Experience is thus the basis for reflection.

What experience has the preservice student encountered which can be reflected upon in a way that will not only support a change, but provide a progressive systematic means to improve upon the past experience and become closer to expectations of mastery of content? Without reflection, past experiences merely become happenings.

Reflection is the connection between the past and the future. Therefore, it is appropriate to consider the function of the portfolio as a 'reflective' instrument, containing concrete data on which the preservice student can continue her/his developmental process and progress toward the expectation of improvement.

THE PORTFOLIO AS A REFLECTIVE INSTRUMENT

As a result of the revision of the secondary education teacher preparation program, it was decided that students would be given developmental assignments. Content would be introduced and extended in generic pedagogy courses, and developed and implemented in subject specific pedagogy courses. Prior to this revision, students were given an assignment in the generic pedagogy class (i.e. lesson design) and then at the next level they were asked to produce another example of that assignment and extend it based on the new knowledge.

Currently, however, students complete assignments in generic pedagogy classes, begin a portfolio, and revisit these assignments for the purpose of extension and modification in later classes. This helps the student to see how new knowledge builds on the old, and shows the 'connected' nature of their program of study. It prepares them to become reflective practitioners and therefore becomes the basis for self-evaluation as well as instructor evaluation. Additionally, the reflective pedagogy portfolio helps students more readily see their growth over time. The portfolio is started with the sophomore level field experience course and is continued through the entire professional sequence until candidates are ready to seek employment.

CONTENTS OF PORTFOLIO

The contents of the portfolio are course-specific and are identified in the following tables:

Table 1. CONTENTS OF THE PORTFOLIO, PART A.

Pedagogy I – Organization & Management	Pedagogy II – Teaching Reading in the Content Area
• Classroom Management Policy	• Textbook Inventory
• Lesson Plan	• Directed Reading Activity
• Observation Task Report	• Lesson Design (study skills, vocabulary)
• Research Articles	• Student Assessment Activity
• Videotaped Mini-presentation	

Table 2. CONTENTS OF THE PORTFOLIO, PART B.

Pedagogy III – Subject-Specific Methods	Pedagogy IV – Student Teaching
• Weekly Lesson Plan	• Unit Plan
• Unit Plan	• Videotaped lessons
• Modified Classroom Management Plan	• Summative Report – Supervisor
• Integration of Technology (lesson)	• Objective Report – Cooperating Teacher
• Learner Assessment Instruments	• Self-Evaluation (student teacher)
• Field Experience Summary	
• Videotaped Presentations	
• Self-Evaluation (of videotape)	

ROLE OF THE PRESERVICE STUDENT

The Rowan Teacher Education Model exemplifies a profound connection among all pedagogy courses. For example, one of the requirements for Pedagogy I is the preparation of a lesson plan. During this course, the student is taught and practices designing a generic lesson plan with a concentration on writing behavioral objectives, logical sequencing, and continuity throughout the procedure for presentation and question development. In Pedagogy II, students revisit the lesson design assignment. This time the emphasis is on teaching vocabulary, comprehension and study skills related to the student's discipline. Also, close attention is paid to selection of materials/text and student assessment.

The commencement of the methods course, Pedagogy III, now focuses immediately on continuing the development of the lesson plan in specific content areas. The preservice student presents to the methods instructor her/his portfolio. The process for reflection is begun as a large group discussion in which the preservice student shares strengths and weaknesses indicated from the previous course and instructor. Indication of needs for improvement are then discussed and it is upon those individual weaknesses that the preservice student continues toward mastery of the lesson plan.

The growth in the above process is adapting the procedures for designing a generic lesson plan to incorporate the specific content and appropriate teaching strategies. The outstanding feature is that the preservice student does not start from the beginning but continues based on previous experience and evaluation and knowledge of improvement.

ROLE OF THE SUPERVISOR

As the preservice student enters student teaching, s/he is equipped not only with the pedagogy and content knowledge necessary to teach, but with a portfolio which will be looked upon as a continued guide to improvement for modification of instruction. Previous experience provides the preservice student with an instinct for what is to occur and some reassurance of the means to manage various situations which may arise. The supervisor is provided with a cumulative record of progression which enables her/him to educationally and professionally guide the student teacher throughout the semester. The portfolio gives the supervisor a 'running' record of the preservice student's performance and accomplishments, and areas which may need to be addressed throughout the semester. On each of the assignments included in the portfolio, the preservice instructor's comments are provided as well as the preservice students self-evaluation.

For the supervisor, the portfolio is reflective in the sense of becoming familiar with an individual whom s/he may not know. Therefore, the supervisor will be able to be a positive contributing factor to the continued growth and development of the preservice student rather than a potential negative influence for lack of knowing.

THE EFFECT ON COLLEGE LEVEL TEACHING

The use of the reflective pedagogy portfolio influences the way college instructors teach the various courses. First, there is much more collegial communication and cooperation. Frequent meetings are held by faculty teaching the same course, as well as larger group meetings for all faculty teaching any of the sequenced pedagogy courses. There must be constant articulation and agreement among and between these faculty members for the courses to proceed successively.

Secondly, faculty members teaching the courses must stay current and feel comfortable with the fact that feedback given to students is now open to scrutiny by fellow faculty members teaching successive courses. It requires a particular type of confidence in one's ability as well as an open-mindedness toward professional criticism.

Thirdly, college faculty must become more flexible. A change in any one part of the secondary education teacher preparation program affects all other components. Faculty members must be ready to make necessary adjustments or defend the position to maintain status quo.

CONCLUDING REMARKS

At Rowan, the faculty in the Secondary Education Department have found the reflective portfolio to be as beneficial and valuable as the summative portfolio. The reflective portfolio allows the preservice student to become involved both internally and externally in the teaching profession -- 'to be thinking as a teacher' -- from the first pedagogy course. The instructors and student teaching supervisors have found reflective portfolios to provide a smooth transition and connection from one pedagogy course to the next. At the same time, the preservice student is addressed as an individual -- all of which contributes to developing the preservice student's personal and professional teaching style.

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ELECTRONIC MENTORING AMONG ELEMENTARY EDUCATION INTERNS: POTENTIAL PROMISES AND PITFALLS

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INTRODUCTION

This paper summarizes successes and frustrations encountered during the initial efforts to establish electronic mentoring opportunities as part of the preservice teacher intern experience at Florida State University (FSU). College of Education faculty, graduate students, undergraduate elementary education majors and a representative of the Florida Department of

Education participated in a project designed to prepare undergraduate teacher interns to utilize FIRNMAIL, an existing electronic mail (e-mail) network in the state of Florida. The use of FIRNMAIL to mentor preservice FSU students in the College of Education continues to present a variety of challenges and to offer numerous opportunities for collaborative teaching and learning activities.

Background

Preservice teachers often are assigned student teaching responsibilities in distant, off-campus locations as part of "learning to be a teacher." Efforts to improve communication between these interns and their on-campus faculty mentors have resulted in the use of a variety of technologies including computer-based electronic mail networks.

The FIRNMAIL project coordinators were aware of similar successful endeavors in other states across the nation. The majority of similar projects identified through reviews of the literature were e-mail or bulletin board based experiences that offered preservice teachers an opportunity to share their student teaching experiences with other students, teachers, and/or professors.

The following suggestions and cautions emerged from the review of the literature:

1. Electronic mail can enhance communication between faculty and students who are doing their student teaching at a distance from the university

campus. However, e-mail may not entirely replace site visits.

2. Projects that provided student teachers with computers to use in their homes were popular with the participants. In fact, having access to a computer at home was considered perhaps the "best part" of the experience.

3. Projects that were described as successful usually required rather than invited student teachers to use e-mail. E-mail interaction included activities such as exchanging lesson plans, responding to lesson plans other student teachers had mailed, and analyzing a lesson that the student teachers had presented that week.

4. Support from computing services staff is very helpful.

5. Student teachers may hesitate to use e-mail after training is completed or the project is terminated. Student feedback suggests that the process is too complicated or too time consuming to be useful.

6. Training student teachers to be comfortable and confident using e-mail is critical for the success of projects. Repeated hands-on practice sessions are useful in building student confidence, and stressing

> the benefits of using e-mail helps motivate students to learn.

Even though project coordinators could not entirely arrange for optimal conditions as suggested in the literature, awareness of prior projects served to guide the planning of the project and indicated potential trouble spots. In addition, findings emerged as significant factors associated with the successes and frustrations of the FIRN project which should be helpful to those engaging in similar efforts.

GETTING STARTED

Though the project coordinators had an idea of what they were getting into, the FIRNMAIL mentoring project was and continues to be a highly demanding project requiring the concerted efforts and energy of a number of people. During the summer and fall of 1992, the two senior authors, faculty from the FSU College of Education, and a FIRN representative from the Florida Department of Education collaborated to plan and provide training in the use of FIRNMAIL to twelve student volunteers during their off-campus internship experiences.

Two primary short-term goals of the project were identified: 1) design, develop, and deliver FIRNMAIL training to undergraduate interns; and 2) identify and overcome unforeseen obstacles to access and use of FIRNMAIL. These short-term goals supported the long-term goal of the project to provide electronic mentoring and support for off-campus student interns.

Based on the results of this pilot study, adjustments were made to the training. In addition, a number of graduate students joined the project to serve as FIRNMAIL trainers, trouble shooters, and mentors.

Data from the pilot indicated that undergraduates had little information or experience with electronic mail. However, after being introduced to FIRNMAIL, they became extremely excited about the potential of e-mail in their classrooms for both personal productivity and instructional uses. The pilot also uncovered numerous obstacles related to logistics and the use of hardware that required attention prior to the next phase.

During the Spring 1993 semester, FIRNMAIL training was provided to all elementary education students assigned as teacher interns in Leon and surrounding counties. The FIRNMAIL training was part of the required coursework associated with these internships and was conducted during normal class hours. Teaching has been called a culture of isolation -- FIRNMAIL offered a tool to overcome this by providing a means of networking and support.

The FIRNMAIL training and anticipated future use of FIRNMAIL facilitated meeting three objectives in the course: 1) promoting collaboration and collegiality among interns and others in the field of education;
2) enhancing the students' problem-solving skills;
and 3) integrating technology into the teaching and learning environment.

The training sessions and results are described below from the perspective of the graduate students who designed, presented, and evaluated them. In discussing training, the project coordinators wish to stress that the sessions would not have been possible without the cooperation and support of the Florida State University Academic Computing and Network Services, which permitted FIRN project participants to use the university-wide computer lab facilities.

FIRNMAIL TRAINING

FIRNMAIL training was offered in two-day workshop sessions during the semester with two groups of approximately 30 interns participating. A few weeks elapsed between the first and second workshop sessions, and in total, each group of interns spent four hours (two hours each session) in the Macintosh laboratory in the campus computing services classroom.

Each workshop session was divided into two sections. During the first half of the workshop, the interns worked through selected sections of a HyperCard stack on the basics of telecommunications and a computer-based tutorial on FIRNMAIL (University of South Florida, 1993).

The instructors introduced the sessions with the HyperCard stacks. The last section of the stack simulates logging into FIRN and sending and receiving messages without actually requiring an on-line connection.

During the second half of the first session, the interns engaged in on-line registration to become actual users of FIRN, making remote access to FIRN available just as it is in schools across the state. Supporting print materials provided to the students included general information on FIRN and a print-based instructional unit for using FIRNMAIL, developed during the pilot project. The print-based instructional unit was intended to be used for review and exploration during the interval between the first and second workshops and contained examples and practice exercises.

After a brief re-introduction, interns were assigned partners in the lab and practiced sending mail to each other during the first half of the second FIRN session. Once involved in this activity, students were delighted to observe instantaneous communication. The second half of the second session was used to introduce the interns to other services available through FIRN, once again using the HyperCard stack to provide an overview. The stack also provided general information available through other communication networks such as the AT&T Learning Network and Prodigy.

The reaction of the interns to the training was quite positive. The students enjoyed the sessions and were able to register and log into FIRNMAIL and to send, receive, and delete messages at the end of the workshops. Though, as discussed below, all students were not able to continue to practice and use e-mail in their schools, they felt that simply learning about this resource was a valuable experience. The positive aspects of the workshops as well as areas that should be improved are apparent from student comments cited below.

LESSONS LEARNED

Based upon intern feedback -- reflected here by actual quotations as well as personal observation -- the following suggestions are offered to those who may undertake similar training endeavors.

1. Create a safe environment for learning about e-mail.

The two classes were presented in a non-stressful environment -- thus students were able to comfortably explore the uses of a program such as FIRN.

2. Don't neglect the human element.

"The tutorial program on FIRN was also helpful, but I found the human factor (qualified staff) the most beneficial for this basic intro session."

3. Require and support hands-on activities.

"It is wonderful to have hands-on activities along with the information given through lecture. It helped me to actually hear, see and do instead of just hearing..."

4. Consider options for individual and group learning.

Some students liked working with partners, but others suggested having one computer per person where each individual would work hands-on.

5. Discuss limitations--the students will!

"Problems I foresee in using FIRN myself include: 1) access to the system, i.e., having a modem in the classroom or convenient location; 2) having a supportive faculty who also uses the system; 3) lack of experience (with how to use FIRN, when to use it, and exposure to what FIRNMAIL can help me with as a teacher generally) -- in other words, feeling rather ignorant still with regard to the system."

6. Discuss real-world applications.

"I am excited about using FIRN. It will enable me to communicate with other teachers and interns, professionally and personally. It will be a great help in getting ideas for units and on other school matters."

7. Take advantage of opportunities for "multiple-level" teaching and learning.

Perhaps one of the greatest successes to date of the FIRNMAIL project has been the variety of teaching-learning interactions occurring. This project has stimulated interactions other than the traditional "faculty member imparts information to students" pattern. Undergraduate interns have observed faculty members and graduate students learning to use and using FIRNMAIL. Watching some of their own instructors learn more about FIRNMAIL has prompted discussions of the importance of continued professional growth as well as the implications of change in schools. The FIRNMAIL project has been valuable in providing opportunities to demonstrate the role of teacher as facilitator, mentor, coach, and life-long learner.

CHALLENGES AND FUTURE DIRECTIONS

Lack of logistical and hardware support is the primary impediment to the project. Access to equipment, both at FSU and in the schools, will be crucial for the project to succeed. Though interns were trained, the actual goal of on-line electronic mentoring has yet to be achieved, to a great extent because of logistical obstacles. Even with an extant state-wide network, interns have a difficult time accessing FIRNMAIL. Efforts are being made to provide interns with computers to use in their homes during the internship period in order to facilitate access to FIRNMAIL.

Support for FIRNMAIL mentoring requires continued collaborative efforts among a number of participants. This project has the support of public school personnel, College of Education faculty from a number of programs, the Department of Education, FSU Computing Services personnel, and FSU undergraduate and graduate students.

The development of effective training materials and procedures and the enthusiasm generated by the workshops are the greatest accomplishments of the project thus far. Interns viewed their experiences with electronic mail as valuable for their careers as teachers. From their comments it is apparent that this electronic mentoring project generated a great deal of student interest. It also generated interest among faculty members across the college who foresee the potential for electronic mentoring. The FIRNMAIL project also provided opportunities for interesting teaching-learning interactions at the graduate and undergraduate levels and continues to be a worthwhile endeavor for all involved.

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STUDENT PARTICIPATION IN LARGE LECTURE SETTINGS VIA INSTANTANEOUS SMALL GROUPS

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INTRODUCTION

Few, if any, would argue that the large lecture setting is the most effective venue to promote learning. Nonetheless, owing to the efficiency of the setting, it is likely to remain a fixture in university instruction. For many students, the atmosphere of a large lecture setting contributes to the difficulty of college courses (Geske, 1992). The depersonalization of the student is a key factor in the large lecture environment (Tobias, 1990), perhaps more acutely in the sciences. There are a variety of ways to address the depersonalization associated with the large lecture setting and one such method will be described here.

The primary effect of the technique described below is to generate an interactive learning environment

(Pheonix, 1987) within the natural constraints imposed by the large lecture setting. Participation is generated by using a Socratic Questioning Style (Overholser, 1992). Student response is restricted to small groups, formed "on the spot," a technique that gives rise to the label "instantaneous groups." The main benefit of the technique lies in the decrease in the depersonalized feeling of the course. While the setting is not personal, it is less impersonal and students become more engaged in the classroom lecture.

DESCRIPTION OF THE METHOD

The Socratic teaching style has been recently reviewed by Overholser (1992). At its core is the concept that student responses to questioning provide the bulk of information presented during classroom activities. Thus, rather than expounding in lecture format or "preaching," the instruction directly questions students or "coaches." Partial responsibility for advancing the course is transferred to (the guided) student. This technique is, however, difficult to implement in large lecture settings, because questioning of students is inhibited by the geography (physical layout of the room) and culture (emotional state of the anonymous students) of the environment. Random questioning of individuals is intimidating and susceptible to difficulties associated with attendance patterns. Questions directed to the entire group are commonly viewed by the students to be rhetorical, so often only a handful will reply. Thus, in the large lecture setting, questioning alone will not assure an interactive environment.

One solution to the problem of using Socratic questioning in the large lecture is to question small groups of students who are seated near each other in the lecture hall (Holme, 1992). By addressing a small group of students, the "faceless crowd" dissolves for a moment and the instructor and students interact on a personalized basis, though by no means on a personal one. Different groups are chosen to answer different questions during the course of a lecture, so that individuals have direct interaction with the instructor on any given day. Thus, movement of the instructor into the seating of the lecture hall is required, an activity that tends to disrupt the impression of the instructor as an oracle, putting more ownership of the material onto the students.

RESULTS OF USING THE METHOD

While there are other effective methods to generate interactive environments in a large lecture setting, the use of instantaneous groups has some unusual benefits. Most of these benefits are derived in the changed impression students commonly have about the environment of a course. To assess these attitudinal variables, surveys of student opinions have been conducted in the general chemistry course where this method has been implemented. Two surveys with a total of 293 respondents have been conducted. Results are summarized in Table 1.

Table 1. SUMMARY OF STUDENT RESPONSES

Questions*	% Yes	% No	% Other
Have you answered a question during a Socratic lecture?	49.8	50.2	
Have you known an answer and not offered it?	49.8	50.2	
Have you experienced this method before?	49.2	50.8	
Do you find Socratic lectures are more or less helpful for understanding the material?	79.6 more	6.2 less	14.2 neither
Are pauses associated with the Socratic method distracting?	10.4	88.2	1.4 indifferent
Are you better prepared for class because of the method?	47.1	45.5	7.4 neither
Would the method be more effective with random questioning of individuals?	11.6	85.3	3.1 indifferent
Would the method be more effective with voluntary contributions awarded extra points?	37.5	59.0	3.5 indifferent
Should any student be able to answer a properly phrased question?	61.9	33.9	4.2 indifferent
Are students hurt or benefitted by offering an incorrect answer?	62.0 benefitted	17.8 hurt	20.2 both/neutral
Do you prefer questions asked of the whole class or small groups?	14.8 whole class	73.5 small groups	11.7 no preference

*Questions are edited for brevity.

The key features are that students find this type of teaching style more helpful, they prefer questions asked of small groups and they strongly reject individual questioning of students in the large lecture.

One issue not covered directly by the survey, but voluntarily offered by the students is the change in the feeling of the course. The impersonal atmosphere is perceived to be lessened as exemplified by the following quotation taken from the survey, "(I like) small groups because in a class this size, when a teacher asks a question of the entire class it's as if they don't expect or care for an answer. In small groups, it's as though the teacher cares about the response." Another student pointed out, "(I like) small groups, it is personalized, yet not too personal." These comments are representative of the majority who voted a preference for small instantaneous group questioning. This type of anecdotal comment points to the change of atmosphere in the course that is perceived by the students.

While these positive student attitudes, both statistically and anecdotally, present a case for the use of instantaneous groups, one must recognize the trade offs involved. Invariably, while using this method, the instructor will cover less material. For many this problem causes considerable concern, particularly in curricula where subsequent courses rely on the base built in the large lecture, entry level courses, a situation considered common in the sciences. Thus, the issue of resulting comprehension and retention of material must be addressed.

Long Term Efficacy

The long term efficacy of this teaching method is difficult to gauge. A reasonable first attempt is to determine the relative performance of students in the subsequent course, following an entry level exposure to this method. The students polled in the survey summarized in Table I were enrolled in general chemistry. Of those students in the first year of this course, 49 continued and enrolled in Organic Chemistry, where they comprised roughly half of the enrollment.

The performance of these students as compared to their counterparts who took general chemistry within a more traditional format is quite similar. The average grade of these students on the first test (where background might play some role) was 84.4 as compared to the class average of 85.3, with standard deviation of both approximately 12. The total course average was 323.5 for the experimental group versus 319.9 for the class. Standard deviations in this score were roughly 50. The group of half the students received 65% of the A grades given in the organic course, though these data likely reflect that the best students go on immediately and continue to do well.

Thus, while not conclusive, preliminary findings indicate no significant differences between students who are exposed to this method and those who are not, at least in terms of grade performance in subsequent classes. Anecdotal evidence from laboratory teaching assistants indicate a somewhat improved ability at data manipulations, again an issue that is difficult to quantify. Thus, while the method has not led to a dramatic improvement in subsequent performance, it has also not diminished performance due to loss of coverage of material. Therefore, the positive attitude effects of the method as delineated in Table I are neither challenged nor supported by performance criteria and may be judged on their own merit.

CONCLUSION

In conclusion, it is worth noting that this method is applicable to courses outside the science area. Interactive methods have been suggested for a variety of subjects and this method is an effective means to provide dialogue in large lecture settings. The drawbacks of reduced coverage do not appear to diminish performance in subsequent coursework. Therefore, the positive effects on student attitude suggest that this method is a useful tool for teaching the large lecture format. Students perceive a more personal atmosphere that promotes both learning and morale.

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ESTABLISHING
A
TEACHING SUPPORT CENTER
AT A LAND GRANT
UNIVERSITY

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INTRODUCTION

At the present time, North Dakota State University is engaged in a multi-level program for faculty development. These multiple factors include Bush Foundation supported activities as well as activities funded directly by the University. Included in the items presently funded by the University are teaching improvement projects, department/unit-based projects, and developmental leave supplements.

In the Bush Foundation project, five components are now, or soon will be, underway. The Teaching Support Center is one of the components with a mission to develop and sponsor a wide range of activities to strengthen the pedagogical, professional, and technological skills of the North Dakota State University faculty, teaching assistants, and lecturers.

In March of 1992, a request for a director of the new Teaching Support Center at North Dakota State University was posted. Because of the emphasis on Total Quality Improvement at North Dakota State University, a proposal for a tri-directorate was submitted by two faculty and one administrator from the School of Education. In May, this configuration was accepted and approved.

In June 1992, the two faculty co-coordinators and associate vice president for academic affairs attended a Bush Foundation Summer Institute held on the St. Olaf Campus in Northfield, Minnesota. This institute facilitated the North Dakota State University team in developing a three-year plan for the new Teaching Support Center. The institute at St. Olaf College allowed for the enhancement of team spirit which was desired for the new center, provided an opportunity to interact with professionals on other campuses involved in faculty development projects, and provided the team with perspectives on faculty development very different from those found on a land grant campus.

The Teaching Support Center has no permanent facilities and is currently being housed in the School of Education. Two faculty from the School of Education and the associate dean of the School of Education split a 25% coordinator position. One quarter-time graduate assistant works directly on projects for the Center. Staff support costs are currently being absorbed by the School of Education. The original budget for the Center was small -- $2500. In October, the Center received additional support from the North Dakota State University Faculty Development Committee of $1000 to be used in acquiring resources for the Center.

TEACHING SUPPORT CENTER PLAN

The plan that was developed in June of 1992 contained the following 13 objectives:

1. Determine the needs and intensity of needs of faculty members in the area of teaching support.

2. Collect resource materials and document the use of the materials by faculty.

3. Communicate to the university information about the faculty development program.

4. Provide opportunities for training in issues of faculty development.

5. Assist in the promotion of the WIC (Writing Intensive Component) portion of classroom instruction.

6. Assist in the development and integration of culturally diverse teaching activities.

7. Develop an understanding in faculty of the use of student and peer appraisal/assessment techniques for the improvement of instruction.

8. Generate an awareness of the role of the student in instruction in order to help faculty develop strategies that increase their use of student-centered learning.

9. Help faculty improve specific methods in teaching, e.g. test construction, modeling, grading, lecturing, syllabi development, and others.

10. Help faculty more effectively interact with students in a variety of settings, especially advising.

11. Help faculty improve abilities in classroom management, including ethics, cheating, plagiarism, and other dimensions of classroom management.

12. Promote in faculty high standards of professional ethics.

13. Develop a data base for faculty involvement in faculty development activities.

Each of these objectives were further defined by tasks to be accomplished in order to meet the objective. Then, evaluation and assessment measures were identified.

TIMELINE - IMPLEMENTATION

After the objective, tasks, and assessments were identified, a time line for implementation was designed. It was determined that some objectives would be accomplished quickly,whereas others will span the three years of the grant. Therefore, the timeline established was based on the tasks identified.

During the first year the Center staff have learned many things and have accomplished many things. In August, 1992, the first one-day workshop was held for new faculty and teaching assistants. Plans were made for approximately 40 attendees, and over 60 people attended. The activities for the day centered on an orientation to the support services on campus, plagiarism and cheating, relationships between faculty and students, teaching methods/techniques, syllabi construction, and surviving the first day of class. The evaluations indicated that the program was well-received by all participants.

In September, a questionnaire was sent to all faculty and graduate teaching assistants to assess their views on faculty development at North Dakota State University -- what currently is and what should be. The results of the survey assisted the staff in developing mini-sessions (offered during the second semester) as well as in planning for the next two years.

Articles have been written for "It's Happening at State," a campus publication. The article content varies from promoting sessions sponsored by the Teaching Support Center to brief summaries of resources acquired by the Center.

Mini-sessions were developed and held during the second semester for interested faculty members or graduate teaching assistants. Topics included:

1. Classroom Discussion Methods

2. Role Playing in the College Classroom

3. Hypercard -- What It Can Do for YOU!

4. Syllabi Components

5. Powerpoint -- Making Your Presentations More Professional

6. Using Questions in the College Classroom

7. Classroom Computer Technology

In addition to these local sessions, the Teaching Support Center provided the opportunity for interested faculty and graduate teaching assistants to participate in the live teleconference "Writing Across the Curriculum."

Each program sponsored by the Teaching Support Center is videotaped and made available on a check-out basis to any interested parties. This provides an opportunity for those unable to attend to reap some benefits from the sessions.

OBSTACLES AND BENEFITS

During the past year, the Teaching Support Center has faced major obstacles while still reaping many benefits. Many of the obstacles encountered are all related to the same problem -- lack of money. Even though the co-directors of the center were to be released a total of 25% time, not one of the co-directors was able to be released from other responsibilities. Time tradeoffs have been a constant battle during the year.

One major obstacle still faced is the lack of a permanent facility/room/laboratory that provides the Teaching Support Center with a visible place for faculty to gather. The phone numbers used are the personal numbers of the coordinators in the School of Education, which causes problems for some of the faculty and graduate students.

An obstacle that is beginning to be overcome is the attitude of faculty toward improving their teaching skills. Most of the faculty have never received any formal training on how to be effective teachers and believed that effective instruction "just happened." Slowly, throughout this year, that attitude is beginning to change.

At the beginning of the year, some faculty viewed the Teaching Support Center as another one of those things that will go away without impacting them. Today, with support from the deans, department heads, and academic vice president, the Center is being viewed more favorably. Good teaching is becoming more important at

North Dakota State University, thus faculty are looking more seriously at what occurs in the classroom and beginning to take advantage of the Teaching Support Center.

In addition to the obstacles, the Teaching Support Center has reaped many benefits. A concerted effort was made to identify key faculty in all colleges and request their help with different tasks of the Teaching Support Center. This provided a means for the Center to promote programs and also to discern exactly what the needs of the academic community were. It also provided the Center with a group of individuals concerned about teaching and willing to share information with their colleagues via the mini-sessions.

Faculty across the campus are beginning to request items from the Teaching Support Center and use them in an effort to improve their teaching. This benefits both the faculty and the students at North Dakota State University and ultimately the Teaching Support Center.

The Teaching Support Center has focused the attention of the academic community on the importance of teaching once again. This is not to imply that many faculty were not concerned with quality teaching. However, teaching is becoming more important in the promotion-tenure process and thus is becoming more important to the faculty.

The mini-sessions have allowed faculty concerned with good teaching to see that there are other faculty with the same desires and ideals. The opportunity to talk with colleagues across the campus in diverse academic areas has enriched the participants.

Assessing the Assessors: Toward A Modified Portfolio Method of Assessing Student Writing

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INTRODUCTION

Assessment has become increasingly prominent in American universities. Faculty are now asked to clarify precisely what is expected of students in specific courses, in their majors, and as university graduates. The goals of each specific course, each degree program, and the whole of general education are expected to be identified -- and some well defined, consistently applied methods of assessing how well those goals have been realized is expected.

In this atmosphere of pervasive assessment, it is hardly surprising that programs assessing student writing have become a common point of both discussion and contention within the profession. Teachers of writing recognize their responsibility to help students become more proficient communicators and more effective and sophisticated thinkers during their tenure in the university, but at the same time the faculty recognize the peculiar difficulties attendant upon the large scale assessment of student writing.

The purpose of this paper is to briefly summarize the process in which writing faculty at Embry-Riddle have been engaged in reviewing standard methods of general assessment. The goal is to move toward a system that more fully benefits students and faculty alike. Hopefully, the results of this review of the more popular methods of assessment and the efforts to arrive at a fruitful solution will provide readers with cause for reflection and, perhaps, bases for modifying their own approaches to assessment of student writing.

METHODS OF ASSESSMENT

The Holistic Method

As in many universities across the country, for some time all of The Embry-Riddle first year students have had to pass a freshman-level writing proficiency examination before being allowed to proceed to the ensuing courses in the English/Communication sequence. Near the end of the freshman composition course, each student has been required during a one hour class session to produce, in response to a previously unannounced topic, a piece of writing that would then be evaluated holistically by two readers other than the student's instructor. This kind of assessment of student samples by external evaluators is intended to reduce the possibility of promoting students who display fundamental deficiencies in their writing. Students failing the proficiency exam have to repeat the course (and the exam as well, next time around).

The responsibility for directing the freshman proficiency exam accompanied the role of coordinator of the freshman writing course, a role assumed by this author. It was clear after brief exposure to the system that it had inherent problems, and these faults (among a longer list of other specific troubling features), appeared to apply to holistic scoring of writing in general. The general findings follow.

1. The kind of writing done (impromptu) and the conditions under which it was done (short, high pressure test situation) were not consistent with those under which most of the students write during the term. The sample being evaluated was probably not representative. As a result, some of the student essays evaluated as not passing were produced by students regarded by their instructors as average or better writers. Such inconsistency could serve as a direct affront to the instructor's credibility.

2. A holistic grade communicated nothing of value to the student. A student who produced a failing sample was not informed of the precise deficiencies

to be addressed. Thus the question, can effective remediation follow from unclear identification of problematic areas of performance?

3. Norming sessions to assure uniform standards among readers were artificial since some faculty necessarily modified their usual evaluative criteria in order to conform to the group standard. Also, the results of the holistic grading experiences indicated that despite the calibration efforts, discrepancies among readers necessarily occurred. For example, during one semester, from a total of 645 essays evaluated, 101 were evaluated as "low pass" by one reader and "fail" by another. And it was, of course, precisely identifying this boundary between what is "acceptable" freshman-level writing and what is not that defined the purpose of large-scale assessment measures.

Because of these flaws with the holistic method -- and because it was recognized that variations among readers' perceptions of the quality of any given student text were natural, unavoidable, and not something to be artificially suspended for the purpose of testing -- the holistic essay examination was abandoned and alternatives considered.

The Traditional Portfolio Method

Close investigation of the plethora of available literature describing traditional, full portfolio assessment (Belanoff & Dickson, 1991; Belanoff & Elbow, 1986;

Burnham, 1986; Simmons, 1990; and Smit, 1990), as well as discussions with faculty at other universities having experience with this method suggested that its own limitations argued against it. Primarily, the sheer bulk of material and the labor-intensive nature of reviewing portfolios of all students made it impractical. While the portfolio method may be preferable to the holistic because it involves multiple samples and encourages open discussion among readers, it -- like the holistic method -- also poses a challenge to the autonomy of the instructor when all students are asked to submit samples of their writing to external evaluators.

ASSESSMENT GOALS

Ongoing discussions of student writing assessment at Embry-Riddle have led to the conclusion that the assessment process itself should achieve a limited, specific set of goals. Among these are the following:

1. External evaluation should center only on those students displaying questionable ability in writing. Students who, according to the professional judgment of the instructor, have shown average or better performance during the freshman year should remain outside of the process. This provides incentive for the student and it serves to return some autonomy to the instructor.

2. Since the faculty recognizes variations in evaluative criteria or emphases, the most fruitful focus may well be on the evaluative practices of the instructors themselves. In-depth discussions among faculty over the evaluation of student texts would likely serve to heighten readers' awareness of their own assessment procedures, awaken them to the insights and alternative methods practiced by some of their peers, reinforce instructors' sense of their relationship to what are revealed to be departmental academic standards, and enhance dialogue/collegiality among faculty in the writing program. Articulating and demonstrating evaluative standards in response to essays written by students for course assignments could be more effective in creating and/or maintaining departmental assessment standards than short, deterministic norming sessions.

3. It is believed that students should have some control over which samples of their work will be assessed.

The Modified Portfolio Method of Assessment

In response to the above, the faculty have now adopted a modified portfolio system of assessment that has as its emphases both a "check" on students with marginal abilities in writing, as well as a stimulus to faculty for the purpose of better ensuring standards within the university and maintaining creative dialogue among assessors of student writing. At present the system follows these guidelines:

> 1. Near the end of the freshman composition course, students with course grades in the range of C- to F must submit portfolios for evaluation. The C- to F grade range has been identified as the "compassion zone"--i.e., it is suspected that some students needing further attention to their writing before they are promoted to the next level of writing courses are often "sliding by" with grades as high as "C-".
>
> 2. The portfolio submitted by the students must contain one in-class, one out-of-class, and one documented essay of the student's choice. Should an instructor have no students in this grade range, at least two of the section's least effective writers must submit portfolios.
>
> 3. Collected portfolios are divided evenly among sets of three portfolio reviewers; these trios are arranged, so far as possible, to join evaluators with divergent pedagogical philosophies. The student's instructor is a member of the review trio.
>
> 4. Each member of the portfolio team determines whether each portfolio in her/his possession represents work worthy of passing the course. Readers register a mark of "pass" or "fail" on separate scoring sheets; in the event of a "fail,"

written comments justifying the mark must be offered.

5. In the event of a "pass/fail" split between readers, readers must confer, together with the student's instructor. If a consensus is not reached, a designated juror (the writing course coordinator) decides the grade. Students who fail the portfolio assessment must repeat the course. Ideally, "mini-courses" of remediation for each student who fails should be identified, with attention centered specifically on those areas of identified deficiency. At present, available resources do not permit this to be accomplished.

Since, as emphasized above, evaluative criteria applied by various readers is the crux of any non-objective assessment method, of equal importance in this assessment process is the attention given to the assessors themselves. Twice each semester, dialogue sessions centering on evaluation of student essays are organized, as outlined above. The divergence among evaluations of a given text is indeed a point of concern for any involved in assessment programs, but it is doubtful that enforced standards, via frequent norming sessions, represent a worthy option. Instead, increased dialogue among members of the profession is encouraged as well as a heightened critical awareness of personal evaluative standards and the methods with which they are applied.

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THE NEW CLASSROOM ENVIRONMENT: TEACHING WITH COMPUTERS

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INTRODUCTION

Writing began as a way to objectify thoughts, first in paint on cave walls, then in cuneiform on damp mud tablets, and finally with ink on paper. Critics say that writing with computers is unnatural, yet no one recommends returning to petroglyphs and pictographs. Writing by hand or with a typewriter is much less convenient than using a word processor. Nevertheless, many literate people remain sentimental about pen and paper.

Despite positive reports from writing teachers who use computers in class, department heads and composition directors often cite research which provides data to support the contention that students do not become better writers when they use computers (Summers, 1985). Articles critical of computerized writing classes offer six basic objections. The most frequent complaint is that writers who use computers cannot view an entire document at one time, and therefore may focus on chunks of writing rather than the whole document. Other critics believe all computerized writing is freewriting, and that fluency leads to sloppiness (Riley, 1990; and Stillman, 1985). Riley states that computers encourage students to tinker too much with writing, quoting Cockburn's assertion that computerized writing degrades prose style. Stillman (1985) points out that better typists get more out of word processors at first, but adds that even two-fingered typists eventually catch up.

However, positive experiences with computer classrooms outnumber negative reports. In contrast to the above critics, some researchers have praised the increased fluency of writing on a computer. Teachers using computerized writing in their classes report that even students who said they hated composition grew to enjoy writing. When revision means recopying an entire paper by hand or retyping without making any mistakes, students report feeling defeated before they begin, but students who use word processors revise extensively (Bickel, 1985; Keith, 1991; Riley, 1990; and Womble, 1985). With time and practice, an initial tendency to focus on surface errors of punctuation and spelling gives way to revision for logic, meaning and depth of development.

Despite some reports to the contrary, many teachers and students find word processing software easy to use. Learning commands as needed enables writers to progress swiftly in computer use (Evans, 1985; Greenleaf, 1992; and Stillman, 1985). Students feel proud of neatly printed papers and want to make the prose as good as the printing (Bickel, 1985; and Keith, 1991). Some writers revise directly on the screen, while others need a hard copy, but according to Stillman (1985), revision progresses through the same steps with or without a computer. Easy collaboration and enthusiastic peer review sessions impress students and teachers, as do publication opportunities made possible by computer design and layout programs (Evans, 1985; and Greenleaf, 1992). Many students can articulate the writing processes they use, enabling them to refine procedures and become better writers.

FROM WATER TO LAND:

THE NEW ENVIRONMENT

Computer classrooms differ from traditional classrooms in mobility, furnishings and ambient noise level. A traditional classroom with moveable chairs allows teachers and students to construct a variety of environments to fit lectures, class discussions and small group work. In contrast, the Liberal Arts Computer Classroom, one of nine computer labs at Idaho State University, has three rows of tables bolted to the floor. Despite the static furniture in this room, students move their chairs to form small groups and turn towards speakers during class discussions. Because the terminals emit a low humming noise and the room is a large rectangle with many hard surfaces, teacher and student must speak in loud, clear voices. The clicking of keyboards as students take notes bothers some, but most adjust quickly.

This classroom is equipped with 24 IBM-compatible terminals connected to the university network. A dot matrix printer sits on a desk in the front of the room, and a laser printer has been placed in a closet in the back corner. Dot matrix copies are free, but students must pay 10 cents per sheet for laser printing. Because the dot matrix printer makes loud clattering noises which prevent conversation or learning, the teacher usually turns off the printer at the beginning of class.

Student consultants knowledgeable about the campus system staff the computer labs. Teachers may reserve a computer lab for one class session or an entire semester.

Using New Tools: Software

Students using the system have access to many types of software, but WordPerfect 5.1, Drawperfect and PC Chalkboard work especially well for writing classes. After learning a few basic commands, students write and revise easily, asking about other commands as needed. Drawperfect helps writers present information visually with graphs, charts and drawings, and students enjoy adding professional-looking graphics to their papers.

PC Chalkboard, an on-line blackboard, enables the teacher to broadcast from one terminal to the rest, or from up to four terminals to a variable number of receiving terminals. This program is useful for demonstrating revisions with sentence lifts and sentences with representative errors copied from complete assignments. Students revise according to suggestions from the class, while others watch the process on their own screens.

Conversion programs are necessary for students who have off-campus access to a computer with incompatible software. The word processing menu offers two choices. WordPerfect Conversion Utility works for some programs. Recently the Computer Center added Word for Word, which automatically translates documents from one program to another while preserving much of the formatting. Macintosh users must go through a preliminary conversion step on a Mac in the main computer lab before using Word for Word.

SURVIVAL TECHNIQUES

Some students want to take the computer writing courses, while others drop the class after the first look at screen and keyboard. If course information contains the words "Computer Skills Required", students can choose whether or not to sign up. Idaho State University charges a $10 user fee, and the course schedule lists this information. The Computer Center offers free workshops on use of software available on the network. A simple keyboarding course on diskette helps students improve typing skills.

Teaching and Learning Evolve

Critics of computerized instruction believe the courses focus more on keyboarding and software than subject matter, but short lessons in computer use can be built into a course. On the first day of class, the student consultant gives a brief lecture about logon procedures and negotiating the menus. The syllabus states that each student must bring 2 diskettes to class, and stories from former students who lost papers due to bad disks help convince the new class to maintain backups for all files. During the rest of the semester, the consultant frees the teacher by troubleshooting computer problems.

A Cave of our Own

A subdirectory sets aside a portion of the mainframe computer's memory and holds class files accessible to teacher and students. The teacher saves syllabus, handouts, assignments and evaluations in the subdirectory. Students respond with reading notes, class notes, questions, group notes, test answers and papers. Instead of notebooks and folders, students carry diskettes which hold class files. The teacher can copy student files onto diskettes or access the system by modem. When reading student writing, the professor comments and demonstrates revision strategies, then saves graded work back into the subdirectory.

Trapped in the La Brea Tarpits

The system contains pitfalls for users. Sometimes students save documents without specifying a directory. These files disappear into the system, but the consultant calms worried students and helps find their files.

Inexpensive diskettes frequently have bad sectors, and students may ignore a formatting message about bad sectors instead of trading the diskette for a new one at the bookstore.

Graphics can cause problems for the teacher. Occasionally a student uses incorrect commands relating to placement of graphics. When the teacher opens the document, her/his computer's memory disappears into the black hole and the computer locks. Again, the consultant saves the day.

A logon jam occurs when 24 people attempt to logon simultaneously; the process may take as long as 15 minutes. A good consultant reminds exiting students to logoff five minutes before the new class begins so that incoming students have time to logon. Separating logon initiations by a few seconds prevents traffic jams, and students willingly arrive a few minutes early to be logged on and ready to write when class begins.

SURVIVAL REQUIRES CHANGE

Despite the aura which surrounds writing with pen and paper, as computer use increases, college and university classes will migrate to computer classrooms. This change is likely to occur even if future studies show no substantial quality differences between writing by hand and writing with computers. Once someone learns to use a computer for writing, that person does not go back to writing by hand or with a typewriter. Teachers must become computer literate, but need not be experts to adapt to teaching in computer classrooms. Subject matter and teaching methods will evolve to fit the new environment.

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THE DYADIC ALTERNATIVE: ORGANIZING STUDENTS INTO COOPERATIVE PAIRS

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> ...although a problem which resists solution by traditional means may be insoluble, the probability is rather that those means are themselves inadequate and in need of being transcended in a fresh approach.
>
> Ghiselin, "The Creative Process" (1952)

INTRODUCTION

The idea that the collaborative work of two persons might exceed that of two individuals working separately was first noted in the old testament by Ecclesiastes more than twenty-five centuries ago. In that document he confided that "two are better than one." Ecclesiastes did not identify the two as members of an unique pairing, as a dyad, but his descriptions agree with that special designation. Despite its biblical injunction, the idea that two could work together to help one another did not make much of an impact on people or organizations for a very long time.

It was not until the twentieth century that Georg Simmel (1902) defined the dyad as two who cooperate and work as a unit. At the time, he was a pioneer of the new science of sociology, and was responsible for describing group characteristics. While Simmel contributed much to an understanding of personal relationships, he made no claims about the effects of the two who collaborated as a dyad. Simmel was content to describe the dyad as a "...two-person group." (Simmel, 1902) He never tried to show that the dyad would outperform individuals.

About twenty years after Simmel had explained his concept of the dyad, Martin Buber confirmed the importance of the idea. In his book "I and Thou" (1958), he described the members of a cooperative as "seeing each other as subjects and not as objects and being aware of the other's feelings as well as one's own"; two could perform better than one only "if each member of the pair knew the other, as I and thou and not merely as I and it, as a sum of qualities, strivings, and inhibitions, and as whole beings." (Buber, 1958, p. 132). He felt that the pair could be productive only if they were to meet again and again as partners in agreement or in discord. In order for their effects to be unified and significant, the collaboration must not be casual; they must have interacted long enough to be considered a single unit instead of two separate persons. (Kushner, 1986)

This article is an attempt to reconcile two positions: one, that two are better than one, and two, that there is no extra value to collaborating with a partner. The author uses his experience in the field of education to show that students could be more productive if they were to work in pairs as cooperative members of dyads, as an alternative to either working independently or in competition with one another.

THE PAST IS PROLOGUE TO THE FUTURE

In the past the author has attempted to gain evidence to determine if "two are better than one." In one study that dealt with a non-trivial cognitive task, concept formation, he showed that dyads could outperform individuals (Licht, 1971). The research involved two junior-high schools that were de facto racially segregated; in one school both the students and staff were identified as members of an American minority population; the other school population consisted of Caucasian Americans.

After students in both schools had undergone concept-formation training and testing, the test results showed that the minority students, as dyads, outperformed the Caucasian students who were working as individuals. This outcome suggests that one approach to helping minorities become more competitive might be to reorganize classrooms to utilize a dyadic system. That study was a formal investigation of an earlier teaching experience of the author, when he was a fledgling science teacher in a Detroit, Michigan junior-high school, for three years in the early 1960's.

At that time the author was concerned because pretests showed that his students did not seem to know many of the major science ideas that they should have learned in elementary school. Without this knowledge students would be handicapped in their efforts to learn the scientific concepts in the junior-high school; in addition, the students might not have the skills that would be required by their high school teachers, when the students entered the tenth grade.

In an attempt to rectify this situation, the author reorganized five classes of seventh to ninth graders. There were three steps to this process. First, he changed the learning and teaching structure of the science curriculum, as it applied to his classes. Then the students were encouraged to choose partners so that they could learn how to cooperate as members of dyads, for study and testing. The third step implemented the changes in procedures, and required active participation of the dyads.

The major structural changes in learning and teaching included visits to the library; using the classroom as a science laboratory for experiments; formative and summative testing of students; and lectures to each of the three larger groups of dyads. The entire class was reorganized into three equal groups of dyads. For a class of thirty students, it meant ten students or five dyads would be assigned to each group.

As part of this process, each group selected a leader from among its members. Then the author, as teacher, delegated to the leaders the responsibility for directing student activities in the library; and for maintaining order during experiments and lectures.

In the library, students would try to answer specially prepared questions by reading parts of science books. Fifty books were available to the students, so they had opportunities to exchange books and answer different sets of questions. In addition, they were allowed to check out books overnight and during weekends.

Part of the classroom was converted into a laboratory in which students in one of the groups could investigate scientific properties. In one instance the students learned about the chemistry of a candle. They were provided with a candle, matches, glass tubing, and a wire mesh. Then they were told to generate questions about how a candle worked. The emphasis was on the question, since the author had explained that "Every question possesses a power that does not lie in the answer." (Wiesel, 1958, p. 14)

While one group was working in the library and another group was working on an experiment, a third group was involved in a lecture-discussion with the author-teacher. The first three days of every week each of the groups were engaged in one of the three assignments; all students had similar opportunities in all three activities, and would often tell each other about their experiences in the library, in experiments and during the lectures. Since the groups were of manageable size, the students in each group were actively involved in their learning. That was verified by improved individual and dyadic performances on summative tests.

The author used this scheme for three years. At the end of each school year, an informal assessment was conducted. It consisted of a series of surveys that were distributed to both students and their parents. The results showed that a high percentage of parents, and almost all of the students, were satisfied with the alternative arrangement of collaboration and students' responsibility for their own learning.

A FRESH APPROACH TO COLLEGE TEACHING

The author has designed a college learning and teaching strategy that was derived from his earlier experiences. It is a system that has five elements, with the dyad as the basic unit in each. The system is intended to be generic, so that an instructor can plan to use the strategy to fit most areas of teaching.

In step one, students meet at the beginning of the semester and introduce themselves. Then they select their partners to make up dyads. Instructors do not direct this process. In step two, practice exercises are introduced so that dyads may try working together in a non-threatening situation. Once dyads are convinced that they have made the right choices, they must remain together for a specified time. After that period has elapsed, the pairs may choose to separate, and either member may work alone, or with another partner.

In step three, the teaching-learning plan is implemented. All students first read text material that usually covers a chapter or unit. Then before the material is discussed, they take a quiz. While the individual formative tests are being scored, students in their dyadic groups take the same quiz, and the scores of the two quizzes are averaged. Step four begins after the errors of the quizzes have been analyzed. At this time instructors know what should be taught and what students have already mastered. To reinforce this idea, students are required to write four related questions from text material. Answers are not necessary, only non-trivial questions which are related to practical applications are acceptable. These are graded according to how well they consider the bases and conclusions of each question.

Step five is the final step. At this time the instructor arranges for the summative testing of dyads and individuals. Alternative forms of tests are suggested and dyads agree on a particular form to be used for evaluation by the instructor. These may include oral presentations, graphic evidence by computer, three dimensional drawings or constructions, role playing, personal conferencing, or some form of written test. Grades are determined by assessing the progress made from the formative tests to the summative results.

CONCLUSIONS

The dyadic idea has biblical roots; however, it is a relatively new idea in American education. The author believes that a dyadic educational system such as this offers a feasible alternative to traditional teaching-learning models. The system would be relatively simple to implement since curricular changes would be modest and the instructor would act as a catalyst for the dyads. However, some teachers might have to learn to give dyads enough freedom to investigate in their own way. Still, most educators should have few problems organizing the classroom and converting to the dyadic system.

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TEACHER IMMEDIACY BEHAVIOR: STUDENT LEARNING OUTCOMES AND EVALUATION

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INTRODUCTION

Is the teaching profession under siege? Are not the evaluators, funders, and beneficiaries of higher education continuing to shake their fingers at the teachers as the primary cause of dropping student performance? What, specifically, can be done in the classroom environment to address and respond to this criticism? The answer to this last question may be enhanced teacher immediacy.

Teacher behavior has been shown to affect the motivation and learning of students (Christophel, 1990). Over 800 articles in 20 leading journals have been published in the last two decades which relate positive verbal and nonverbal teaching behaviors to improved learning outcomes among students. Additionally, many of these same teaching behaviors increase student perceptions of effective teaching, as measured in student evaluations of instruction. Knowledge of course content is, of course, very important, but carefully controlled, empirical research published in leading communication journals offer evidence that student attitudes toward classroom environments, assignments, teachers and themselves, depend to a significant degree on immediacy.

IMMEDIACY THEORY

In Silent Messages, his seminal examination of nonverbal communication, Albert Mehrabian defined the immediacy principle: "People are drawn toward persons and things they like, evaluate highly, and prefer; and they avoid or move away from things they dislike, evaluate negatively, or do not prefer" (Mehrabian, 1981, p. 114). Using this approach-avoidance theory as an affect-based construct, teacher behaviors which demonstrate liking (immediacy) for students relate positively to learning outcomes.

Immediacy increases arousal and changes the academic atmosphere which heightens student motivation, responsiveness, and perceptions of teaching excellence (Allan & Shaw, 1990). Which non-verbal behaviors make teachers more immediate? Smiles, praises, close proximity, high eye contact, first name familiarity, forward body lean, natural gestures -- all convey greater immediacy, hence, greater concern and trust in the classroom.

Using the Immediacy Behavior Scale developed by Gorham, Richmond and McCroskey in 1987 and 1988 (Christophel, 1990), student observations of teacher behaviors have been correlated, using bivariate statistical analysis and multiple regression analysis. The results are compelling, especially in the six classroom dimensions addressed in this presentation: 1) teacher and student perceptions of learning; 2) student motivation and learning outcomes; 3) response diversity in multi-cultural classes; 4) student resistance to task demands; 5) affective learning in divergent classes; and 6) the relationship of humor to immediacy and learning.

SIX IMMEDIACY STUDIES: A REVIEW

As noted, a wealth of research has established a number of diverse relationships between teachers' uses of immediacy behaviors and student affective, cognitive, and behavioral learning outcomes. Immediacy behaviors are categorized as low-inference, meaning actions which can be interpreted accurately, without ambiguity. Also, they are as easy to adopt as to smile or to stand closer to the students rather than behind a podium.

The summaries which follow illustrate methods which can move directly from journals to classrooms. The reviews are brief, presenting from each study only what was investigated and what the results indicate.

Study 1: Perceptions of Immediacy and Learning

Gorham and Zakahi (1990) investigated how students' perceptions of teachers' immediacy behaviors and of their own learning outcomes relate to teachers' perceptions of the same variables. They also questioned whether teachers can accurately monitor their own immediacy behaviors. Previous research (Richmond, Gorham, and McCroskey, 1987) had established the use of perception as an accurate tool to monitor immediacy and learning.

Methods in this study required teachers and undergraduate students to complete a series of measures which combined immediacy and learning scales. Results showed that teachers are able to monitor their own immediacy behaviors; also, students' reports of teacher immediacy are significantly similar to teachers' self reports of those behaviors; and that teachers' perceptions agree with students' perceptions in all three learning categories. Another surprising result found no correlation between teacher immediacy and the degree to which a teacher enjoys teaching.

Study 2: Immediacy, Student Motivation, and Learning

Christophel (1990) sought to determine the relationships among student motivation, teacher immediacy, and student perceptions of the three categories of learning (affective, cognitive, and behavioral). She wished to find out how immediacy relates to student motivation and what would be their combined impact on learning outcomes. Methods included separating motivation into two types: _trait_ and _state_. _Trait_ describes the student's affirmative feeling toward learning in general, and _state_ is the student's attitude toward a specific class. Christophel hypothesized that teacher immediacy could directly impact levels of learning by strengthening student motivation in a course.

Her results showed a positive relationship between teacher immediacy and perceptions of student learning and student in-class (state) motivation. The latter also related strongly to perceptions of student learning. These results indicate that teachers can use immediacy to modify student motivation and increase learning at the college level.

Study 3: Immediacy and Perceived Learning in the Multicultural Classroom

Recent studies investigating teacher immediacy behaviors and student learning outcomes in multicultural classrooms (Powell & Harville, 1990; Sanders & Wiseman, 1990) found a definite relationship between several teacher immediacy behaviors and White, Latino, Asian-American, and African-American undergraduates' perceptions of learning. These results illustrate that teacher immediacy is an important influence in multicultural classrooms, but the behaviors impact the students differently depending upon their cultural expectations. The researchers emphasize that "for all ethnic groups, positive correlations were obtained between immediacy and perceived cognitive, affective, and behavioral learning" (Sanders & Wiseman).

Another study (Collier and Powell, 1990) underscores the complexity of classroom systems composed of multicultural students. Their results show varied effects for students from different ethnic backgrounds as time passes in the course. They recommend further research focusing on the teaching process as it progresses over time. Discussion in both studies emphasizes the need for continued attention to the cultural differences in students' responses to immediacy behaviors.

Study 4: Immediacy and Student Resistance

For this study, students responded by indicating their likelihood of resisting teacher demands relating to such course tasks as coming to class prepared. Methods included the use of four scenarios: an immediate teacher and a non-immediate teacher using both pro-social and antisocial behavior alteration strategies. For example, the immediate teacher in the antisocial condition would admonish the student to come to class prepared "because I will lower your grade if you don't." In the pro-social condition, the direction would be, "Come prepared because you will find it a rewarding and meaningful experience."

Results confirmed that students were less likely to resist the immediate teacher who used antisocial techniques. In contrast, students reported greater resistance to a non-immediate teacher using pro-social strategies. Kearney & Plax, et. al. (1988) concluded that immediacy influences both strategy types, but "students may be more willing to comply with teachers they like as opposed to teachers they don't" (1988, p. 66). Thus, a popular assumption becomes, through research, a conclusion supported by evidence.

Study 5: Immediacy and Learning in Divergent College Classes

The subject here is whether the correlations between teacher immediacy and positive feelings toward the teacher and the course (affective learning) would be as strong in a task-centered course such as accounting (T-type) as they are found to be in people-centered courses such as speech communication (P-type). Kearney, Plax, & Wendt-Wasco (1985) hypothesized that it may be mistaken to assume that teacher behaviors judged effective in one type of course would be similarly evaluated in a different type of course.

Although past research (Hager, 1974) had shown that students in T-type classes prefer teachers to be structured and controlled, results in this study indicated that teacher immediacy influences affective learning outcomes in both P-type and T-type classes.

Study 6: The Relationship of Humor to Immediacy and Learning

Gorham and Christophel (1990) examined how teachers' uses of humor in the classroom relate to immediacy and learning. Humor, a verbal dimension, has been established in extensive previous research as a high impact immediacy behavior (Kane, Suls & Tedeschi 1977; Graham & Rubin, 1987). Gorham and Christophel recorded 206 observations by students of teachers' uses of "a sense of humor." These were analyzed and correlated with overall immediacy and perceived learning outcomes.

The results confirm that both the amount and the type of humor influence learning, but that some types of humor are viewed negatively. Also, in contrast with previous results, there were indications that female teachers' uses of humor did not influence students to evaluate them negatively.

RESEARCH EFFICACY

In the complex interaction of classroom communication, isolating effective and ineffective teacher behaviors is difficult; tying those behaviors to student activity or attitudes requires carefully monitored conditions and sophisticated data analysis. Not surprisingly, partial replications within the six studies produced similar results.

Two-tailed tests of Pearson correlation provided strong statistical support for the conclusions Gorham and Zakahi (1990) reached regarding self-perceptions and observation of teacher immediacy and student learning. While similar correlational analyses produced most of the results for Christophel (1990), Powell & Harville (1990), Sanders & Wiseman (1990), Collier & Powell (1990) and Kearney & Plax, et. al., 1988), multiple regression analysis added predictive data to each study encouraging realistic prescriptive classroom applications. A 2 x 2 analysis of covariance (ANCOVA) gave Kearney & Plax et. al. (1988), their student "compliance-resistance" results using teacher immediacy/non-immediacy and pro-social/antisocial behaviors. Conclusions reached in each of the cited studies rest firmly on correlations and regression results well above minimum levels of significance.

DISCUSSION AND CONCLUSIONS

Current research affirms that teacher immediacy behavior does affect .student performance positively. Students learn more, find lessons clearer and more worthy of remembering, put up less resistance to task compliance, and respond more collegially in the multicultural classroom with immediate, dynamic teachers. Seven behaviors in particular, have been found to produce these results, even in an ethnically mixed environment. They are:

1.Smiling and praising student work

2.Maintaining sustained eye contact

3.Shifting the proximity of self to students

4.Encouraging students to talk; soliciting viewpoints

5.Relaxing physically with an accompanying expressive voice

6.Using relevant humor and personal, positive disclosures

7.Recognizing students by first names or accomplishments

Professional rewards for immediate teaching include enhanced student and administrative evaluations of performance. Evaluation responses which address the classroom learning climate (teacher openness to questioning or disagreement; concern for student understanding; enthusiasm, and level of interest generated in the subject) are influenced by teacher immediacy. Supervisors are more impressed with teachers who are more immediate and perceive them as more effective (Allen and Shaw, 1990).

Communication research validates the relational interpretation of immediacy behaviors. Simply put, teachers can respond to society's criticism by exploiting the research findings that teacher immediacy and student affect have a substantial, positive association.

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INTEGRATING TECHNOLOGY IN THE FOREIGN LANGUAGE CURRICULUM

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INTRODUCTION

WHY climb the "technological" mountain -- that is, why bother with the complication of learning a new technology and then putting it to work in the teaching/learning context of your discipline? The answer is NOT: "Just because it's there." BUT, if it works, use it! The former answer has been the pitfall of many instructors ever since the advent of the 35mm film. Using a film was an easy way to fill up the class time. Students liked it, but seldom knew what they were supposed to learn from it and seldom retained what they saw. Technology has progressed much since the 35mm film. Indeed, teaching/learning strategies should also progress with the times and at a proportionate ratio to human progress in other fields.

For technological innovations to be effective, students need to know the specific objectives of each unique strategy. The use of technology in teaching is becoming more significant because it avails us of the world; it brings distant people and places closer, and closes the geographical distance of reality through the FAX, et. al.

Today's technology offers so many choices that faculty need to review the variety of technologies available, evaluate them, and ask: "What can this do for instruction?" Faculty need to venture into a new Renaissance of learning techniques. Some initial guidelines are: 1) select a specific teaching/learning objective; 2) review various technologies asking "How can it work for this objective?"; 3) select a technology that seems apt; and 4) try it! Share the excitement of discovery with the learners -- they tend to be experts in knowing what helps and what does not. But, the learning objectives should be clear at all points of the process.

SKILL-INTEGRATED

FOREIGN LANGUAGE STRATEGIES

Speaking Skills

For the enhancement of speaking-listening skills, the use of original video scripts can be an effective approach (also called the "Nothing succeeds better than success" video) for a beginning course in foreign language. During the first two-thirds of the term students practice oral language in a variety of ways (pronunciation-intonation practice, choral repetition, dialogues with peers, skits, etc.) During the last third of the term they begin to prepare a script for video-taping, which is actually an extended dialogue using the very same language structures they have been practicing all term.

The basic rules given to the students are: 1) the script must be in the target language (both written and performed) and not translated; 2) no reading is allowed during actual video-taping -- they must know the script or ad lib if necessary; 3) students may work in groups of two to six people -- this is good for peer support, and experience has shown that seldom does one individual fare well on a solo performance, while more than six people makes the group too unwieldy for good group dynamics; 4) any topic for the script is valid within the realm of decency -- this provides for access of different interests and tastes among students. Successful contexts are suggested at the outset such as children's stories, known TV formats, famous personalities, commercials, etc.; and 5) actual taping usually takes place in the classroom at a regularly scheduled time with the instructor doubling as camera-person, unless adequate support staff are available -- thus the instructor can provide prompting, guidance, moral support, and suggestions for the best shot together with encouragement.

The results of this type of video project are truly amazing! The final videotape is not professional nor perfect, but for the speaking/listening skills of a foreign language student it is absolute success. Students actually see themselves speaking another language with each other...they understand each other and they judge themselves in comparison to each other's performance.

They can internalize their own success -- they have achieved a sense of teamwork with their peers, undergone intensive oral practice on limited material, and have a sense of ownership in this cooperative learning project. They usually get so involved in the production that they lose much anxiety about using the target language. This "principle of indirection" refocuses attention, thus decreasing the anxiety of performing in another language.

Reading Skills

Reading skills can be enhanced by the use of the IBM compatible computer program, PC-GLOBE, available at a nominal cost in Spanish and French. This program offers data regarding the countries of the world. It is especially helpful for Spanish students because the Hispanic World encompasses so many countries, each with its own unique geography and demographic data. Students are assigned to simply print up a variety of "specific" screens of data on one country. The choice of countries is done in class to insure that students in each class work on different countries.

Beginning students are required to print only two screens of data. They must learn to read the many choices in order to access the screens they must print. They find it easy and usually get intrigued with the instant information available. Most of the many screens and even initial data screens are full of cognates which make them more user-friendly to beginning students. The main objective of the assignment is to learn to use the program. This does not put undue pressure on beginning students, but it does avail them of an interesting source of information. In the follow-up course, they have an extensive project with this program for which they must print at least twelve different screens of information, use it as a basis for a round-table discussion in a mock meeting of the Organization of American States (OAS), and then use it again as the basis for a two to three page composition developed and produced on a computer using a standard word processing package such as Wordperfect.

Writing Skills

Writing skills can be enhanced through the required use of WordPerfect or other standard word processing package. Foreign language students need to become more aware of the different diacritical and punctuation marks for the language of study. If they are required to use a word-processing system like WordPerfect, they must learn to make a unique and singular physical movement for each special diacritical or punctuation mark. This is kinetic learning. Instructions for keyboard use are given in class.

First semester students are given assignments for which they must copy certain text. Second semester students are required to do all composition assignments on Wordperfect. They are also told that this skill is a possible addition to their job résumé: they can do word-processing in a second language. Suddenly, their study of a foreign language takes on new overtones. This skill may help them in their careers and in the "marketplace."

Many students who have undergone this experience decide to take additional courses in computer science. They have acquired greater awareness of their world and a little advice as to how to go forward with their careers.

Another way of enhancing writing skills through technology is the use of an International Pen Pal Bulletin Board. Beginning students are just learning composition in the target language. Class exercises are usually "vocabulary group" oriented. But toward the end of the first semester students should know enough to write about themselves. They are told that if they want a pen pal in Spain, they should write a short letter of introduction. They are free to write about themselves, their family, their different tastes. This is a highly motivating exercise; it is a reality check! Students tend to write more and better when they are writing to an actual person in another country. One hundred percent participation has normally occurred -- for no grade.

CONCLUSIONS

Original video scripts, PC-Globe, WordPerfect, and an international pen pal network all enhance skill acquisition for first semester foreign language students. They also enhance motivation and involve active participation on the part of the student. Teachers are guides, but students must learn.

Such exercises allow for creativity and individual differences among students both in terms of interest and a variety of learning styles (auditory, visual, kinetic). They also require of the student structural manipulation of the language, pronunciation/intonation practice, listening/speaking skills, and significant reading and writing. These approaches help bring the target language, culture and reality closer to the student and impose a greater awareness of the global village -- a reality for today that will be even greater tomorrow in their world -- the world our students will face.

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ENHANCING INSTRUCTION WITH MULTIMEDIA

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INTRODUCTION

Educational technology, defined broadly, includes everything from blackboards and desks to books and computers. Naturally, none of this technology guarantees that learning will take place; but in the hands of skillful teachers and motivated students, its use can enhance instruction in significant ways. New technologies are incorporated into teaching methodologies when they help to do the job better. Wax tablets, blackboards, and pencils with erasers can be thought of as technologies designed to make the writing medium more conducive to trial and error, more "interactive" than parchment, print, or ink-pen. Underlying pedagogical objectives, it should be noted, are likely to remain quite stable in the face of change. It is not vital whether students use pen, typewriter, or word processor, as long as they learn to write and write well.

Information technologies, over time, have the power to transform completely instructional methodologies. Print technology, for example, has caused the word "literate" to become synonymous with "educated." Much more than reading and writing is required of the educated person in the modern information era, however. People rely on "multimedia" presentations of sound, image, and text to keep informed, and the computer has become an important tool for helping sort and organize information in its various forms. More importantly for educational purposes, computers are used to locate and process information relevant to individual interests and well-being. People are becoming increasingly less skeptical about the benefits of information technology, but they desire to understand more about its implications for current educational practices. The academic world has moved from "So what?" to "Yes, but..."

MEDIUM AND METHOD

A detailed analysis of the impact of informational media on educational methodology is an elaborate undertaking, as witnessed by the lengthy bibliographies found in the literature on the subject (McClintock, 1993; McLuhan, 1964; Olson & Torrance, 1991; and Postman, 1991). The brief overview that follows is intended to provide a focus on the use of interactive media for enhancing teaching and learning. The various educational media and the methods they support are outlined below in quasi-historical order, from lecturing to computer-aided learning. In reality, the progression is not as linear as the presentation may suggest, and there are important modifications that must be considered for the hearing or sight-impaired student. However, the basic point can be demonstrated that educational methodologies have been deeply influenced by the information technologies available. To paraphrase Marshall McLuhan, we may say, "the medium is the method."

The Oral Medium and Direct Methods

The oral medium may be viewed as a kind of educational technology. It gives rise to the classroom as the domain of instruction, as students must be within sight and hearing of the teacher. The physical presence of the instructor permits the novice to observe a role model and identify a human resource for individual educational needs. Direct methods tend to be holistic in nature, involving students with the primary material of a particular subject matter. The instructor often exemplifies the ideals of the instructional outcomes. The implied social contract is that instruction will be of value to the individual, and the instructor takes responsibility for the educational well-being of the student.

The Print Medium and Analytic Methods

The individually owned textbook and the vast information resources of the library provide an extension of the learning environment beyond the oral classroom. The print domain, as is well known, transformed educational methodologies. It has also led to additional role models for students, in particular the scholar as researcher, independent of affiliation with church or state. Teaching methods based on print technology tend to exploit reductionist techniques for analyzing a given subject matter, and the very process of writing provides support for detailed hypothetico-deductive examination. The implied value of text-based methods for the learner is the development of critical thinking, in particular the ability to resolve conflicting interpretations arising from the expanded sources of primary data.

The Information Media and Audio-Visual Methods

The modern educated person relies on information media for continuing education. Photojournalism provides images for enhanced visualization of information, expands access to information, and offers new possibilities for the democratization of knowledge. The advertising and entertainment industries have developed methods of presentation, designed to exploit the commercial possibilities of the broadened marketplace, that can not be accepted uncritically by educators. Educational audio-visual methodology requires provision for critical thinking skills, and it must be coupled with a value system that includes responsible empowerment of the student. Audio-visual methods are essentially holistic in nature. They have been employed successfully for overcoming language and literacy problems in learning and are particularly effective for distance education.

The Digital Medium and Interactive Methods

The term "digital" dramatizes how radically different the new educational medium is. Digitized multimedia objects -- sounds, images, and text -- may be created, edited, linked together, and transmitted with great ease. Instructors and students can control their presentation and analysis with little more computer expertise than keyboard or mouse skills. The methodology is interactive, and therein lies its interest for educators. It engages students actively in learning and helps instructors to introduce students to primary data in sound, symbol, or image form. Instructors can function as guides to sources of knowledge, navigating a new educational domain, the information network. Interactive methods combine holistic and analytic techniques to help build in safeguards against the uses of informational media for propaganda or commercial exploitation of the learner.

TECHNOLOGY AND LEARNING MODES

The use of the media for educational purposes has historically served to broaden access to knowledge. The digital medium will not replace the oral, print, or image media; it will simply transform the way in which they are used for educational purposes. An understanding of the new medium can be achieved by observing carefully how teaching methods are being altered to improve learning. It may be helpful, therefore, to focus briefly on some basic learning processes and attempt to evaluate how information technology can contribute to their enhancement.

The Sequential Learning Mode

Most subject matters require moments of guided study of primary observed data or original material. Students benefit from instructional sequences based on the mentor's knowledge of learning development. Well-designed computer courseware incorporates this knowledge and provides enhanced ease of access to instructional sources and sequences. The computer is also used to vary the instructional sequence according to individual learning styles, offering semi-linear variations on instruction with options for learner control. The computer can also collect information on the learning process and offer data for course improvement, student guidance, and empirical research.

The Relational Learning Mode

Meaningful learning requires that information be contextualized and that the student discover relationships with other areas of knowledge. Computer-based reference materials assist in this process by providing the learner with access to related information. The non-linear storage of information permits rich possibilities for exploration and provides support for learning that is driven by student query. Hypermedia links provide unlimited possibilities for multi-sensory support for different learning styles.

The Creative Learning Mode

Although reception and discovery learning are highly valued, students must be able to utilize what they have learned if they are to retain it. Computer-based learning offers tools that provide for integrating ideas, creating new knowledge, and aiding in self expression. Tools may be combined with the sequential and relational instructional materials to create learning environments, such as writing labs and simulations for exploring the sciences. The student need not be mystified by gaps between theory and application.

EDUCATIONAL USES OF THE MEDIA

The information age will require an education system that understands human learning and makes efficient use of the entire spectrum of information technology. Teachers will have to understand the media and guide their students in their meaning and use. The following is intended to analyze the value that each medium can bring to the educational process.

The Oral Medium and Validation of Knowledge

The impersonal nature of image media, print, and computing make it unlikely that they will satisfy the normal desire of the student to understand the value of knowledge in personal terms. The classroom -- or some gathering place where socialization can be combined with the learning experience -- is likely to provide the best environment for testing the value of learning on a personal basis. Students want to ask, "What is worth learning?" The answer has to come from someone they trust, someone who will give a responsible answer. In time, of course, they must learn to provide this answer themselves.

The Print Medium and Synthesis of Knowledge

The print medium will continue to be valued for its power to provide access to powerful exemplars of human thought and syntheses of knowledge. Textbooks will no longer be valued for merely mapping the curriculum and providing consumable exercises and drill; these functions are done much more efficiently in other media. The successful text will provide an answer to the question, "What is worth keeping?"

The Image Medium and Visualization of Knowledge

Students who can visualize what they are learning about early in the educational process do not waste time chasing poorly formed hypotheses. New concepts derived from well-chosen exemplars that relate to the students experience lead to the ability to understand abstractions at the micro and macro levels. The educational use of visual imagery should answer the student's question, "What is this all about?"

The Digital Medium and Utilization of Knowledge

The digital medium can provide educational material in all of the media mentioned above in a context that is interactive. The learner can take greater responsibility for driving the educational process and learn to use tools, such as word processors, spread sheets, and the like, that will serve in the real world. The digital medium will help provide an answer to the question, "What can I do with what I know?"

KNOWLEDGE FROM INFORMATION

The computer is widely used for the creation, transmission, and storage of information. These functions are essential to the educational enterprise, but they do not define it. The learner must internalize and systematize information to create knowledge that can be applied in a meaningful way. Teachers will continue to be valued for their ability to manage the developmental processes of education, not just serve as sources of information. The skillful teacher knows how to withhold information, if need be, to clarify essential concepts. An understanding of the new information technologies is important for teacher training, especially since changes in the educational media alter methodologies. Which methods are simply enhanced by the digital medium? Which ones are deeply transformed by it? Educators must be prepared to re-examine teaching, learning, curriculum, and governance as medium and method evolve.

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ADDRESSING

CREATIVE INTELLIGENCE

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> "To give a fair chance to creativity is a matter of life and death for any society."
>
> Arnold Toynbee

INTRODUCTION

In his classic book on creativity--Applied Imagination (1963)--Alex F. Osborn discussed, in what he termed an over-simplification, the four major functions of the human mind: to absorb, to retain, to judge, to imagine. Through absorbing and retaining, individuals take in information; through judging and imagining they process information. In formal schooling a great deal of attention is paid to the first two functions, some is paid to the third, and little or none is paid to the fourth.

"Intelligence" in the earliest use of the term by the Romans meant information. In military affairs today the term retains that definition. Yet the more modern use of the word "intelligence" is derived from observations of the naturalists, the early biologists. Their observations noted that living creatures had two general ways of coping with their environments: through instincts or intelligence. Instincts appeared to be inherited behavior patterns for meeting very common situations in machine-like ways. Higher forms of animals (including humans), in addition to some instinctual behavior, primarily exhibit an ability to learn new behavior patterns in order to cope with situations. They program themselves through experience. Psychologists, therefore, commonly adopted this view of intelligence: the ability to learn, the ability to develop new ways of responding to situations encountered.

THEORY AND RESEARCH IN CREATIVITY

The monumental work of J.P. Guilford (1977) in developing his structure of intellect model reveals his discovery of 120 mental abilities for which humans have capacities. The Stanford-Binet, the Scholastic Aptitude Tests, the Graduate Record Exams, to name a few qualifying instruments still in extensive use today barely scratch the surface of human intelligence, let alone address that which places humans above all other members of the species - creative intelligence.

Creative behavior proliferates in young children. E. Paul Torrance's (1979) work with children on his Tests of Creative Thinking demonstrates that maturation, socialization, and educational practices deprive children of environments that nurture this innate talent. Most research states that the average person uses between two and ten percent of their creative ability. That's like never driving a fine sports car over 10 miles per hour.

In recent years there has been a new surge of interest in the field of creativity. For decades the only journal in the field was the Journal of Creative Behavior published by the Creative Education Foundation in Buffalo, N.Y. Now a handful of other journals are making their debut. Higher education courses in creativity have multiplied almost astronomically in the last ten years. There are several very encouraging aspects in this regard. First, the increase in creativity research is a demonstration of renewed interest in and attention to the field. More importantly, however, the increase in courses taught and programs offered attest to the belief that this inborn type of intelligence can be rejuvenated even after the years since childhood that it has been allowed to atrophy.

CRITICAL ISSUES

In order to access these latent abilities, a number of issues need to be addressed. One of those issues is of acceptance of the notion that one has these capacities. Ralph Waldo Emerson once said, "What lies behind us and what lies before us are small matters compared to what lies within us." (Emerson, 1953, p. 446).

In Donald MacKinnon's (1978) famous research with architects at Berkeley's Institute for Personality Assessment and Research a major finding among the architects deemed most creatively productive was a strong sense of self as a source. The subjects exhibited a balance between a respect for knowledge outside themselves and knowledge from within themselves.

A second major issues is one of environment. Children are often raised in an environment in which they are praised when they are right and punished when they are wrong. They (and adults!) need some space, some tolerance for experimentation, some encouraging climate that allows the failure that will accompany some risk-taking. Creative behavior is driven by risk-taking. Harvard's David Perkins has said, "The creative person works at the edge of his/her competency, not at the center." (1981, p. 74).

A third issue is discovery of those internal and external barriers that keep individuals from performing as creatively as they might. Far more prevalent seem to be the internal barriers, many of which stem from external experiences, such as ridicule, fear of punishment, reluctance to risk being wrong, etc., which derive from socialization and educational practices.

The final issue to be addressed here deals with approaches to encouraging creative behavior. There are numerous secondary processes in existence, for example, Creative Problem Solving, Synectics, Lateral Thinking. These processes serve as external stimulation for the participants, helping to generate divergent thinking and, indeed, contributing to self-esteem. All methods of this nature are valid and excellent starting points for getting at an individual's primary creative process - that which makes each person truly unique. There has been much influence in accessing the area from Eastern World philosophies and practices (Capra, 1975). For example, much has been done with intuition as the first phase of the creative process (Shallcross & Sisk, 1989).

CONCLUSIONS

It is encouraging to witness the upsurge in activity toward increasing opportunities for creative intelligence to be recognized and to flourish, especially in higher education. Granted, much needs to be done, but there is now a plethora of research and curriculum development. And, goodness knows, there is the need.

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LINKING THEORY AND PRACTICE IN TEACHING

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INTRODUCTION

When practice is an integral part of learning (e.g., science laboratories, technical skills, professional practice), understanding the underlying theory enhances the meaningfulness of the procedure for the student. Educators have struggled for years to guide students beyond procedurally driven practice to see the connections between theory and practice. Tyler (1949) values integrating theory and practice in education:

> Without theory, practice becomes chaotic, merely a collection of isolated, individual cases. Theory gives meaning...On the other hand, without practice, theory becomes mere speculation. Realities of practice provide a check upon pure speculation (Tyler, 1949, p. 55).

Understanding the theory which guides practice can be a nebulous, frustrating experience for students who are anxious to "do" the procedure. Students perceive laboratory practice as performing rather than analyzing theory as the driving force behind the procedure. A challenge for educators is to foster theory driven practice rather than procedurally driven, rote mode practice. Strategies are needed to support meaningful learning to move students beyond rote mode practice, and to link theory and practice in curricula.

THEORETICAL FRAMEWORK

Meaningful Learning

Educators realize that learning occurs on a continuum from rote mode (memorization) to meaningful learning. Meaningful learning is a conscious process of integrating new knowledge with one's prior knowledge in ways that strongly link the two (Smith, 1991). As the continuum progresses from rote mode towards meaningful learning, the learner is involved in such strategies as thoughtful replication and practice, affective commitment to relating new and prior learning, and incorporating new knowledge into one's cognitive structure (Novak & Gowin, 1984).

Ausubel's (1978) famous axiom addresses the significance of one's prior knowledge as follows:

> If I had to reduce all of educational psychology to just one principle, I would say this: the most important single factor influencing learning is what the learner already knows. Ascertain this and teach him accordingly (Ausubel, 1978, p. iv).

Linking Theory and Practice

Gowin (1981) stressed that practice is only theory driven if links between theory and the procedural steps are clearly identified and understood. Connections between theory and practice need to be consciously studied before actions take on intentional meanings. In order for students to make links between theory and practice, learning must be at a significantly higher level than rote mode.

Cognitive Strategies

One cognitive strategy, the concept map developed by Novak (Novak & Gowin, 1984), is a schematic picture of one's mental understanding. Since meaningful learning is based on adding new knowledge to prior knowledge, it is essential to identify the student's knowledge base. By organizing concepts in a hierarchical order with linking words to explain their connections, learners demonstrate their degree of understanding. Teachers can use concept maps to evaluate learners' prior knowledge, and link new content to that prior knowledge. When misconceptions exist, they are readily evident on the map.

The following is an example of a concept map for the basic [nursing] skill of proper body mechanics. The list of relevant concepts are rank ordered hierarchically from broadest to most specific:

safety

stability

center of gravity

line of gravity

base of support

muscles (large, small, strained)

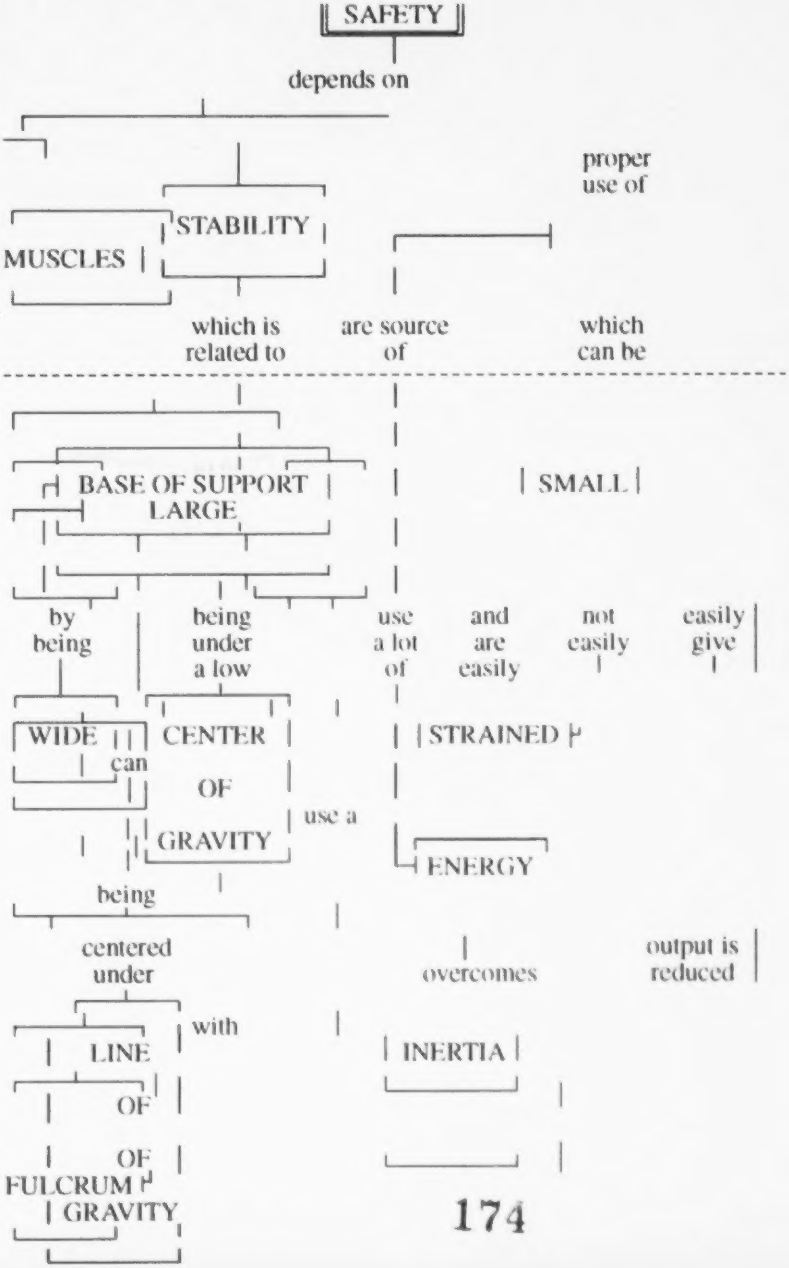
energy

inertia

fulcrum

The map maker looks for links between and among concepts based on one's own cognitive structure. Finally a map is drawn to depict the mental understanding of proper body mechanics (Figure 1).

Figure 1. CONCEPT MAP ON BODY MECHANICS


SAFETY
depends on
proper use of
STABILITY
MUSCLES
which is related to
are source of
which can be
BASE OF SUPPORT
LARGE
SMALL
by being
being under a low
use a lot of
and are easily
not easily
easily give
WIDE
can
CENTER OF GRAVITY
use a
STRAINED
ENERGY
being
centered under
overcomes
output is reduced
with
LINE OF OF GRAVITY
FULCRUM
INERTIA

A second cognitive strategy developed by Gowin (Novak & Gowin, 1984) and modified by this author is the Vee heuristic that consciously links theory and practice as the student performs a skill. "A heuristic is a method for problem solving or learning" (McClintock, 1987, p. 44). The "V" shape of the heuristic represents learning a basic skill (the event at the point of the Vee) by analyzing its theory (left side) and practice (right side) domains (figure 2).

Figure 2. THE VEE HEURISTIC

Focus
Question

THEORY	PRACTICE
Philosophy:	Value Claims:
Theory:	Knowledge Claims:
Principles:	Transformations:
Concepts:	Records:

Event

Gowin sees "laying the Vee" on an event as a way of analyzing previous theory knowledge (or identifying the lack thereof), and understanding practice as a theory driven event.

DESCRIPTION OF THE STUDY

A quasi-experimental design was used to study junior level baccalaureate nursing students (n=42) who were taught basic skills in a learning laboratory for one semester. Half of the students (control group) were taught in a traditional practice and return demonstration mode while the other half (treatment group) learned in a traditional mode with the addition of student made maps and instructor made Vees. Objectives were as follows:

1. evaluate whether nursing students who were taught basic nursing skills in a college laboratory with Vee heuristics and concept maps (treatment group) rather than with a traditional mode (control group) would better identify the underlying scientific theory from prerequisite courses for specific nursing skills as evidenced by short answer questionnaires.

2. determine if the treatment group would perform basic nursing skills in practiced situations more

effectively as evidenced by return demonstrations.

Short answer questionnaires asked students to describe the theoretical bases for certain skills. Content analysis of short answer questionnaires evaluated the quality and specificity of responses. Students reactions to Vee heuristics and concept maps also were studied through clinical interviews.

FINDINGS

Students in the treatment group: 1) had a significantly higher mean score for the composite of short answers questionnaires ($p=.005$); and 2) were able to answer five of ten short answer questions significantly better than students in the control group ($p=.01$ - $p=.05$). These data indicated that the treatment group was better able than the control group to state underlying scientific theory which was learned in prerequisite science courses and utilized for specific nursing procedures.

By definition in this research, the application of prior knowledge to present learning reflects meaningful learning. Being better able to articulate underlying scientific theory for specific procedures also suggests the ability to link theory and practice. Results did not support the hypothesis that students taught with Vee heuristics and concept maps were better able to perform basic nursing skills in practiced situations.

Students in the treatment group felt positive about learning with Vee heuristics (81%) and concept maps (69%). Positive comments about Vee heuristics included "Vees helped make me see why we do it, and what's not so important", "Vees pointed out exactly why;... I need to know why I do things; used them to review for the mid term", and "since I learn by figuring out, they helped me to see why to do certain things". It was noteworthy that all principles presented on Vee heuristics were available to students in assigned textbook readings. Nevertheless, responses given for short answer questionnaires demonstrated that treatment students could identify scientific theory for skills significantly better than control students. This finding supports the value of Vee heuristics for linking theory and practice in teaching basic skills.

The value of concept mapping was evidenced in responses such as "they gave me a chance to think of how things fit together; maps encouraged me to refer to readings and notes where I might not have", "maps were good for connecting and building new information on other information; I would definitely use maps again; it was good getting feedback on them and being able to share when she [researcher] felt there was a misconception", "I began to see how a lot more words could be added and would fit", and "incredibly helpful for tying things together".

CONCLUSIONS AND RECOMMENDATIONS

Treatment students could better articulate underlying theory for nursing practice which supports the Vee as a strategy to identify and reinforce prior theoretical knowledge and help connect theory and practice. By identifying theory as the driving force for practice, Vee heuristics may be a significant strategy to assist students move past the rote mode accomplishment of skills.

Concept maps help assess not only one's cognitive structure of prior knowledge but also one's conceptions (or misconceptions) about new knowledge. Connecting prior and new knowledge with a concrete strategy supports meaningful learning. Since most students had positive reactions to learning with Vee heuristics and concept mapping, these two cognitive strategies have great potential for fostering meaningful learning and linking theory to practice.

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